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ABSTRACT

The "silent" classrooms of yesterday are no longer appropriate for today's educational needs. Students require a learning experience rich in oral language, and schools are being asked to educate them for work that requires analytic competence and collaborative interactive skills. A revised curriculum and new teaching strategies are crucial to meeting this challenge. In this book, four teachers provide classroom-tested, research-based instructional approaches that engage students in learning through thought and talk. They show ways to improve significantly students abilities to solve problems and to think critically and creatively by using "Think Trix," a structure of thinking types to signal the sort of thinking that is appropriate to a learning task. The system helps students develop both their analytic capabilities and their academic language skills. The publication explains what academic talk is and why it is important, outlines and advises on how to use the Think Trix approach, explores logistical matters connected to Think Trix as well as modifying the approach for various instructional environments, and for using Think Trix in cooperative learning situations and across the curriculum. Each chapter ends with discussion questions to lead classes or individuals in exploring implications for their own practice. Three appendices present: some illustrative activities that combine Think Trix, graphic organizers, and cooperative learning; the Think Trix symbols and several graphic organizers; and an annotated bibliography. (Contains 23 references.) (ND)

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Engaging Students

Engaging Students

Thinking, Talking, Cooperating

Carolyn Temple Adger
Maya Kalyanpur
Dana Blount Peterson
Teresa L. Bridger

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Preface

Long before they come to school, children have learned to think and talk and cooperate; however, schools have a significant role to play in promoting growth in these crucial human processes. Yet many educators naturally emulate the silent classrooms in which they grew up, where students usually worked independently and talk was the teacher's prerogative, to be doled out to students in small doses as prescribed. Very often what students could say was highly predictable. In classrooms where teachers do the lion's share of the talking and students are required to recapitulate information, they have little opportunity to produce the genre of talk that is generally appropriate in the elite educational and work settings to which all students should have access. Students from middle-class homes may have learned this more decontextualized communicative style outside of school, but other students need to acquire it at school. As demographics change so that schools serve more English-language learners, it becomes even more important to make learning rich in oral language. All students need opportunities to talk at length on academic topics in order to develop proficiency with this sort of language.

Schools are being asked to educate students for jobs that require analytic competence and collaborative, interactive work skills. As a

result, teachers are learning to teach in ways that may be very different from the ways in which they were taught—to engage students thoughtfully and interactively in learning tasks. The challenge for teachers is to modify their cognitive schemas for classroom activity. Becoming adept at structuring lessons that develop students' cognitive and interactional resources takes time, study, and diligence.

This book is for teachers and other educators in search of classroom-tested and research-based instructional approaches that engage students in learning through thought and talk. It is intended to support practitioners in facilitating students' thinking and communication development. Through exposition and example, the book leads teachers to incorporate into their instructional practices a thinking typology called Think Trix, which guides students' reasoning and helps teachers move beyond asking recall questions. When Think Trix combines with cooperative learning, students have a rich sociolinguistic and cognitive environment for talking on academic topics. This book is unique in distinguishing academic talk as a valuable facet of cooperative learning and a crucial skill for students, and in guiding teachers to use strategies that build students' analytic and language interaction skills. It should prove useful in professional development for teachers across the content areas and the grades.

This book reports teachers' classroom experiences with learning to implement Think Trix in talk-filled cooperative learning arrangements. It explains what academic talk is and why it is important (Chapter 1); outlines the Think Trix approach from the classroom teacher's perspective (Chapter 2); advises practitioners on how to begin using the Think Trix approach (Chapter 3); explores logistical matters connected to planning for Think Trix (Chapter 4); addresses modifying the approach for various instructional environments (Chapter 5); focuses on using Think Trix with cooperative learning (Chapter 6) and implementing graphic organizers (Chapter 7); looks at Think Trix across the curriculum (Chapter 8); revisits the topic of students' academic talk (Chapter 9); and rejoices in professional growth (Chapter 10). Each chapter ends with discussion questions to lead classes or individuals in exploring implications for their own practice.

Appendix A presents some illustrative activities that combine Think Trix, graphic organizers, and cooperative learning. Appendix B includes the Think Trix symbols and several graphic organizers. The annotated bibliography in Appendix C shows informational sources.

Stories and Learning

A good story can entertain, warn, advise, touch, illuminate, and teach (Coles, 1989). Because the listener experiences a compelling story personally, stories can be powerful resources in professional development. Out of true stories about practical experience in translating theory and methods study into practice come issues for implementation. Working through these issues, asking questions, and trying out responses help novices build a mental picture of practice. For teachers and teacher interns with a silent classroom mental schema, stories from experienced teachers' practice can create new frames of possibility for talk-filled, structured classrooms where students engage with teachers and one another in demanding cognitive tasks. This book offers stories about teachers working through the challenges, frustrations, disappointments, and excitement of changing their teaching—stories that provide virtual experience for new users of Think Trix. These are stories of changing teacher control into teacher facilitation, of demanding student talk instead of student silence, of presenting cognitive challenges to all students as a matter of course, and of drawing students into classroom interaction so that school is something that they do, not just a place where they go.

The stories told here are real. In Chapter 2, Teresa Bridger gives an extended first-person account of learning Think Trix by doing it in her self-contained special education classroom, and several other teachers report alternative ways of introducing the typology. The other chapters include illustrative anecdotes written by other teachers. Most of the events happened (more or less as reported) to teachers in Baltimore City Public Schools who participated in a research project concerned in part with promoting children's academic language development, and conducted by The Institute for

the Study of Exceptional Children and Youth, University of Maryland, and the Center for Applied Linguistics, Washington, D.C.

Contributors

Many people contributed to this book. Carolyn Temple Adger wrote the Preface and Chapters 1 and 9 and revised the manuscript. Maya Kalyanpur wrote Chapters 6, 7, 8, and 10. Dana Blount Peterson wrote Chapters 3, 4, and 5. Teresa Bridger wrote most of Chapter 2. Many of the stories were written by the teachers and speech-language pathologists from Baltimore City Public Schools who were enrolled in a graduate class on mentoring other teachers in the Think Trix approach. In the text, their names have been changed. Their real names are Nancy Bethke, Pat Buchanan, Nancy Faulkner, Martha Johnson, Vanessa Merrick, Judy Sperling, and Rebecca Turner. Carolyn Dinatale, another project participant, also contributed her stories.

Important contributions of feedback came from Frank Lyman, of the University of Maryland and Howard County, Maryland, Public Schools, who devised Think Trix, based on teachers' classroom practice, and disseminated the approach to and with teachers throughout Maryland and beyond, and who encouraged development of this book. Naturally, the authors are responsible for its final form. Baltimore City Public Schools provided research access to schools, teachers, and students and encouraged teachers to use Think Trix. In particular, Correan Baker and Dorothy Coleman endorsed oral language development as an important educational goal. The experiences of the Baltimore teachers who worked with Think Trix in their classrooms are central to this book. In addition to those who tell their stories directly here, Thomas Brooks, Dorothy Henry, and others contributed significant insights concerning Think Trix as a classroom process. The authors are grateful for the generosity of all these people, and to those who contributed in other ways: Jennifer Detwyler, Center for Applied Linguistics, who encouraged teachers' professional growth; Jay McTighe and Virginia Pilato, Maryland State Department of Education, who advised on graphic organizers and recognized the potential of Think Trix for language develop-

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Engaging Students

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Carolyn Temple Adger is a program associate at the Center for Applied Linguistics in Washington, D.C. Formerly a faculty research associate at the Institute for the Study of Exceptional Children and Youth at the University of Maryland, she directed the research and development project that produced this volume. It concerned the school language experiences of children with disabilities who speak African-American Vernacular English.

Her research has focused on language minority children at school: cross-cultural classroom communication, teachers' choices of instructional strategies, children's dialect shifting in the classroom, equitable speech-language assessment for vernacular dialect speakers, language awareness for students, and academic language development. Other research interests include practitioners' action research in schools. As a researcher, she has conducted qualitative studies in culturally diverse elementary school classrooms in the Washington/Baltimore area. As an adjunct professor at the George Washington University, she taught research methods. In connection with research and development projects, she has designed and conducted inservice staff development programs. She also taught English language arts in junior and senior high schools for 10 years. She holds a Ph.D. in sociolinguistics from Georgetown University, an M.S. in linguistics from Georgetown, and an M.A. in English lan-

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1

Learning Through Thinking and Talking

School is talk. Teachers directing, questioning, and criticizing; students explaining, narrating, and commenting—the give and take of verbal interaction among students and teachers is the very stuff of school. Yet talk is like the water in which the fish swims: Crucial as it is to school life, it is usually taken for granted. Focusing on the verbal interaction through which teachers and students accomplish lessons and other school activities has various payoffs, however, the most important of which concerns students' learning. Cognitive growth happens in the interaction between a learner and an expert (Vygotsky, 1978), and interaction involves speaking or some other method of communication. Thus student talk is not only a window on learning in progress; it is also part and parcel of the learning. Strategically promoting students' verbal interaction can promote their learning.

AUTHOR'S NOTE: Portions of this chapter, which appeared in C. T. Adger (1993), No talking is no good: Students' voices in academic discourse, *LD Forum, 18*(2), 26-28, are used here with permission of the Council for Learning Disabilities.

Academic Talk

What kind of talk do we want students to engage in? No one would suggest that we encourage talk for its own sake. What we want from students is academic talk—talk that fulfills the linguistic functions that make up classroom work. Academic talk includes labeling and describing objects and events; presenting information for display, as well as for explanatory purposes; requesting information and clarifying; retelling events in sequence; and linking personal experience and new ideas to school discourse (Heath, 1986).

Academic talk contrasts with general interpersonal talk, the language genre in which virtually all children are proficient when they come to school and in which they continue to develop competence outside of academic activities (Cummins, 1989; Hoyle & Adger, in press). In informal social encounters, people often convey meaning quite elliptically because they can count on others to figure out their communicative intentions, using shared background knowledge. All communication involves interpreting what people are saying in order to figure out what they mean, and interpretation involves using knowledge about the world, including knowledge from previous interactions with these people. In academic talk, however, people put relatively more of their meanings into words, so that interpretation relies somewhat less on background knowledge. Group identity—such as ethnicity, social class, and gender—as well as social relationships play an important role in how people say what they say (Tannen, 1990, 1994), but academic talk is relatively more focused on conveying lesson-related meaning and less focused on the relationship between speaker and hearer.

Academic talk is not necessarily ponderous. The following simple example of children's academic talk comes from a lesson on main idea in a primary, self-contained special education class in which children are identifying the details in a picture of a dog and cat that convey the picture's main idea. The teacher has asked them to "Give me one detail in this picture to make you think the dog does not like the cat." In this segment, group members are disagreeing over the meaning of the dog's posture.

Antoine: *[When] The dog's down like this, they attack. That's what it's doing.*

Paula: *They're play—they play like that.*

Jeffrey: *Some dogs do, but most of the dogs don't. 'Cause they . . .*

Paula: *My dog does.*

Antoine: *But that's your dog.*

Paula: *I have two dogs and they play with my cat.*

Antoine: *What?*

(Baltimore, March 1992)

In this bit of academic talk, the students are expressing opposing opinions and justifying them with their experiences.

Who speaks academic language? Teachers do, and students learn to do so. However, middle-class children may have an advantage in learning to produce academic language because they are likely to have had the kinds of language experiences at home that provide easy entry into the language environment of school and support development in academic language. For example, mealtime talk with parents and siblings may elicit "reports" from children about their activities, especially those at school. Giving these informal reports, with feedback from family members, helps children learn that reporting is socially valued and that listeners expect reports to have a characteristic structure involving listing events sequentially. For some working-class children, however, language development has been found to involve more interaction with peers and less with adults (Heath, 1983). When children from other than middle-class families come to school, their language use often does not conform to school expectations in various, subtle ways. Their language experiences may not have included displaying knowledge for adults, labeling, and telling school-like stories. If teachers are unaware of regular social group differences in language development, they may assume that children without these skills have a language deficit rather than a different set of language abilities (Wolfram, Christian, & Adger, in press). (We are concerned here with language style and not with dialects. Chapter 9 shows that academic talk does not presuppose a particular dialect.)

Competence in academic language, which is critical to school success, provides the basis for later interaction in work settings and elsewhere in the adult world. It is not enough to have the abilities to do the work; people size each other up based on what they see and hear. Those who can "talk smart"—who use the more decontextualized language register to present their messages—meet others' expectations of competence. They have a leg up. Skill in academic language is only one of the attributes that give students a range of choices after school, but it is an important one.

"Who's Talking?"

Paying close attention to children's classroom talk is a relatively new educational focus, motivated partly by the urgent need to educate children who are English language learners and partly by new understandings of how learning relies on students' verbal interaction. Many teachers were themselves schooled in silent classrooms, so it is understandable that in their own classrooms they post rules like these:

Classroom rules

We will:

1. Enter the room quickly and quietly and take our seats.
2. Look and listen for instructions.
3. Begin work on time.
4. Work carefully and quietly.
5. Respect others.
6. Raise our hands and wait if we have a question or contribution.

(Baltimore, March 1991)

These rules make clear that students ("We" obviously does not include the teacher) ought to remain silent until the teacher calls for them to talk. They imply that the teacher is the main talker and the controller of students' talk and other action.

Student silence is a double-edged sword. The one-speaker-at-a-time ideal, which is still pervasive, relegates nonspeakers to the

listener category, but students who are not speaking are not necessarily listening. They may disengage from the official activity and become available for interactions that conflict with the lesson, or they may tune out. Moreover, the patterns of speaking and remaining silent that become established in classroom communities may not show an equitable distribution of turns at talk. Instead, students who can be relied on to contribute to lesson development tend to talk more and more, while others may talk less and less on academic topics unless teachers work hard to ensure that every student responds. The silence norm represents diminished opportunities for students to develop the linguistic register necessary to successful lesson participation. Thus silence perpetuates itself.

Developing Academic Discourse Skills

Speakers develop oral language abilities through frequent, authentic interaction with proficient speakers. To help students develop skill in academic talk, teachers need to provide a range of interactional structures to ensure that all members of the classroom community engage in academic discourse on a regular basis.

Socially mediated learning arrangements, like the array of cooperative learning structures now used widely in classrooms, have been shown to promote learning for all students, including those with disabilities, intellectual gifts, and diverse cultural and linguistic backgrounds (for research on cooperative learning, see Johnson & Johnson, 1989). They also provide natural environments for academic talk. The student who does not volunteer to talk in whole class discussion is more likely to engage academically in a small group of peers, taking an assigned role, because his or her talk is necessary to getting the task done.

The Think Trix Approach

Creating a social structure that calls for talk goes a long way toward prompting extensive discourse, but it is not sufficient by itself to foster learning. Cooperative learning groups must be given

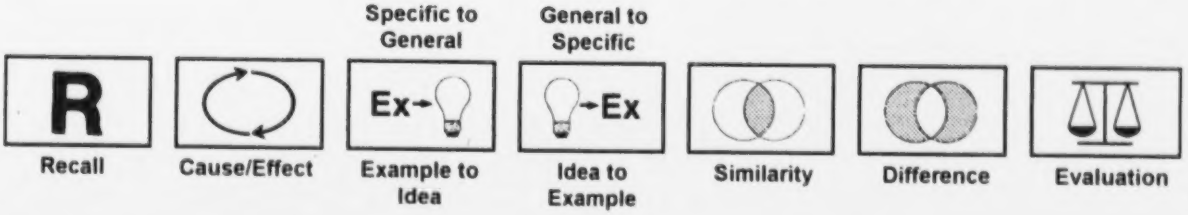

Figure 1.1. Think Trix Symbols
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instructional tasks that demand analysis as well as talk: Cognitive stimulation combined with social engagement provides the environment for cognitive growth. A structure for thinking can be a useful tool. Just as cooperative learning structures guide the interactive experience of learning, a thinking structure can provide organization and discipline to maximize thought in instructional activities.

Think Trix is a structure of thinking types that can be used for talking and thinking about thinking. It includes these basic cognitive operations: Recall, Similarity, Difference, Example to Idea (specific to general), Idea to Example (general to specific), and Evaluation. Teachers can refer to the Think Trix typology to signal the sort of thinking that is appropriate to a learning task. For example, students in a high school literature class might be asked to note similarities and differences in rhetorical style in segments written by Toni Morrison and Jack London. The Think Trix framework includes a system of symbols to which teachers point in asking questions. Teachers have also developed graphic organizers for students to use either in thinking and talking through an instructional task together in cooperative learning groups or in figuring it out individually. These graphic organizers help students represent thought by recording information and the connections among bits of information. Using Think Trix and graphic organizers together helps to structure thinking and language tasks. Think Trix's explicit thinking cues elicit cognitive processes that translate into linguistic response graphically and orally. The system helps students develop both their analytic capabilities and their academic language skills.

The Think Trix approach combines the Think Trix typology, graphic organizers, and cooperative learning. It is complex. Although competent teachers can immediately begin using graphic organizers and focusing their students on thinking skills, they need considerable commitment and support to adopt the Think Trix approach systematically and adapt it to their teaching situation. They need to regularly and rigorously reflect on their practice as they hone their instructional skills. This book is intended to support that reflection by providing advice and cases from implementing Think Trix. In that spirit, the pronouns change from here on. *We* refers to the teachers and researchers whose experience and understandings are described here; *you* refers to practitioners who use this book to enrich

their repertoire of instructional strategies. The design of the book respects the order in which issues are likely to appear, based on classroom implementation experiences in Baltimore City Public Schools. However, the issues are linked; they do not surface one by one.

Chapter Wrap-Up

The Think Trix approach is for teachers who want all of their students to learn to talk smart; to be active, engaged learners who co-construct lessons with them and their classmates; and to have confidence in their abilities to figure things out.

Discussion Questions

1. How important is oral language in your classroom? What kinds of oral language skills are students developing there? How are you providing for their development in this area?
2. How important do you think oral language skills are in the workplace? What place do they play in your job? How do schools prepare students to participate verbally on the job?
3. If you have been using cooperative learning, what have you noticed about students' talk in groups? Would you say that it's academic in nature? In your classroom, what distinguishes academic talk from talk for other purposes?
4. From your own experience or reading, what can you say about a connection between thinking and talking?

2

Focusing on Higher Level Thinking

The Classroom Experience

Like talking, thinking is a taken-for-granted function by which people negotiate the situations of everyday life. Recently, schools have embraced the notion that children can learn to think better, to use thought more strategically in their work, when educators focus explicitly on thinking processes in learning tasks. What are these processes and how can teachers help students think? In this chapter, teachers respond to this important question. Following an overview of thinking and Think Trix, a thinking typology that teachers and students can use to guide thought and to talk about thinking, Teresa Bridger relates her experience with adapting Think Trix for learning activities in her classroom. Then other teachers' experiences are juxtaposed to hers.

Perspectives on Thinking

Teaching thinking skills is likely to be listed prominently in schools' mission statements these days, yet thinking is not easy to

define, and it is not always clear how schools teach these skills or even promote better thinking. No widely accepted definition of thinking skills can be offered here, because educators and researchers who have investigated thinking do not share a unified understanding of what it is. Thinking skills—components of human cognition (Sternberg, 1984)—are categorized in various ways. The familiar Bloom's Taxonomy includes six thinking processes: recall, comprehension, application, analysis, synthesis, and evaluation (Bloom, Engelhart, Furst, Hill, & Krathwahl, 1956). Other researchers who have built on Bloom's work have analyzed cognitive activity differently. Creative thinking is often contrasted with critical thinking, but again, without researchers' agreeing on definitions for either category. Generally, the term *critical thinking* refers to reasoning for purposes of analyzing information, making decisions, or solving problems; *creative thinking* may refer to producing information (Marzano, 1991).

Many school systems have developed or adopted thinking skills programs for students, usually with a focus on higher order thinking skills. Researchers seem to agree on a core notion here, if not the specifics: Higher order thinking is thought that is regulated (Marzano, 1991). These programs encourage students to become aware of their thought processes and to apply thinking skills consciously and selectively. Think Trix is a tool for this purpose.

Think Trix: An Overview

Formulated by Frank Lyman (1981) and incorporating teachers' practice, Think Trix identifies seven general thinking types: Recall, Similarity, Difference, Cause and Effect, Example to Idea (specific to general), Idea to Example (general to specific), and Evaluation. The Think Trix structure assigns each thinking type a label and a symbol for ease of reference (see Figure 2.1).

The Think Trix symbols are also called *response cues* because they cue, or point toward, a particular kind of thinking that is likely to lead to an appropriate linguistic response to a question or direction. Teachers and students refer to this thinking typology with its symbols during learning activities. Pointing to the Cause and Effect

symbol, a teacher might review learning by asking, "What are the possible consequences of smoking?" Pointing to the Example to Idea symbol in an earth sciences class, he or she might say, "Classify these rock specimens." In some cases the name of the thinking type occurs in questions: "Let's look at the similarities among these different ways to find the value of x."

The Thinking Types

Think Trix delineates seven basic types of thinking. Recall thinking involves remembering or finding details or facts or constructs. Thinking that identifies Similarity involves noticing or hunting for shared characteristics or those that are very much like each other. Thinking that identifies Difference involves seeing contrasts among items. Cause and Effect thinking links consequences and antecedents. Thinking from Example to Idea is inductive thinking—thinking that goes from specifics to encompassing concepts. Thinking from Idea to Example is deductive thinking—that which extrapolates from the general to the specific. Evaluation involves weighing the merits of items or concepts. Although each thinking type includes a range of cognitive maneuverings, each type includes these core constructs.

The symbols—response cues—serve various instructional functions. Both teachers and students refer to them in constructing questions or giving directions for academic work. For teachers who are struggling to avoid asking too many recall questions, the symbols, prominently posted in the classroom, can act as a reminder to construct questions and other prompts (requests, directions, etc.) that call for higher level thought from students. Students can devise questions for each other about something they are studying, using the symbols as a resource. For students who are working independently with a text or a problem, the symbols can suggest the scope of analytic thought that might be brought to bear.

"The Think Trix is a cognitive tool that allows students and teachers to know how they know, to dredge up and connect knowledge, to be knowledge makers" (Lyman, 1992, p. 176). When a class becomes thoroughly familiar with the Think Trix typology, they have a shared basis for metacognition—the control of one's own

R **Recall**

facts
plot design
sequence
detail
summary

Similarity

analogy
ratio
comparison
intersection
common element

Difference

contrast
comparison
distinction
discrimination
differentiation

Cause ⇔ Effect

cause
effect/result
motive
consequence
inference
prediction
hypothesis

Idea to Example(s)

categorization
deduction
substantiation
analogy
support

Example(s) to Idea(s)

classification
induction
conclusion
generalization
finding essence

Evaluation

ethical consideration
evaluation
judgment
rating
weighing evidence

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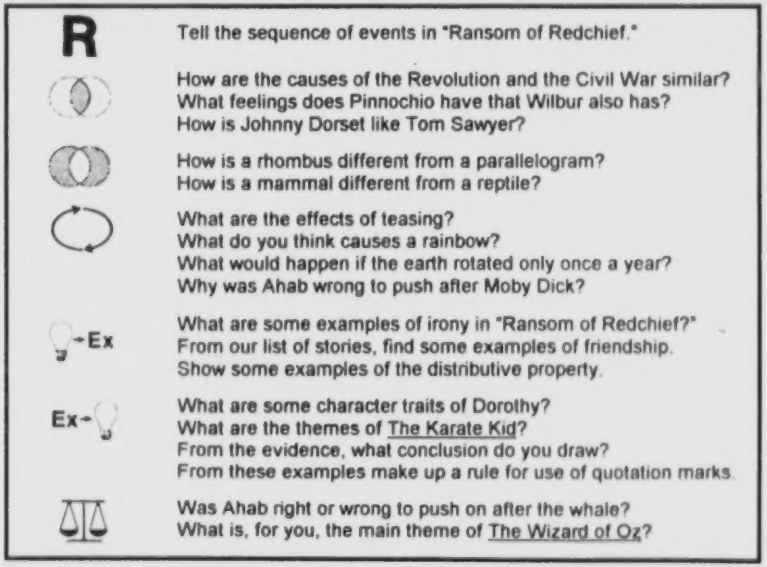
R
Tell the sequence of events in "Ransom of Redchief."
How are the causes of the Revolution and the Civil War similar?
What feelings does Pinnochio have that Wilbur also has?
How is Johnny Dorset like Tom Sawyer?
How is a rhombus different from a parallelogram?
How is a mammal different from a reptile?
What are the effects of teasing?
What do you think causes a rainbow?
What would happen if the earth rotated only once a year?
Why was Ahab wrong to push after Moby Dick?
-Ex
What are some examples of irony in "Ransom of Redchief?"
From our list of stories, find some examples of friendship.
Show some examples of the distributive property.
Ex-
What are some character traits of Dorothy?
What are the themes of The Karate Kid?
From the evidence, what conclusion do you draw?
From these examples make up a rule for use of quotation marks.
Was Ahab right or wrong to push on after the whale?
What is, for you, the main theme of The Wizard of Oz?

Asking questions of different types can be facilitated by mounting cards with the cue symbols as reminders on the classroom walls. As the discussion develops, the teachers (and the students) can use these cues as a guide to construct questions and/or appropriate responses.

Figure 2.1. Thinking Through Question/Response Cues
SOURCE: Lyman (1992, Figure 11.2). Reprinted with permission of the Teachers College Press.

cognitive processes (Flavell, 1981). The teacher can assume that students have a guide to the kind of thinking being called for in classroom activities.

Against this brief characterization of Think Trix, a special education teacher describes how she became convinced of its value for her students, and she offers her experience as a guide for other teachers.

A Teacher's Perspective on Thinking: Teresa's Story

In the past, lessons built around higher order thinking seemed to be reserved for classes of high ability or talented and gifted students; but average students, special education students, and those in low ability classes were more likely to focus on recalling discrete bits of information. As a special education teacher, I became interested in teaching my students to be independent thinkers. Students with learning disabilities, physical disabilities, emotional disabilities, and mild retardation are certainly capable of doing higher level thinking. In fact, higher level thinking skills *must* be at the core of the curriculum for special education students. If we do not help our students to regulate thinking, we may be contributing to a cognitive disadvantage in the school setting and in adult life. Other students who are at a disadvantage because their strengths are not the ones schools typically value—English language learners, low achievers, average students—also need to be supported to achieve metacognitive awareness and analytic capability. Students all across the spectrum of ability and interests need to become adept at thinking critically.

To incorporate a critical thinking skills approach into instruction for special education students, thinking skills instruction must be orderly, structured, and interesting. An orderly method of sequencing instruction is needed to help students not only build upon the thinking skills and knowledge that they already have but also connect thinking skills with various content areas and contexts. A structured set of instructional props, such as Think Trix's thinking types, the symbols that refer to them, and words that cue thinking, can give students a strategy for attacking problems and questions. Finally,

interesting methods of using thinking skills engage students as competent learners in classroom activities and thus inspire self-confidence.

I have used the three strategies of the Think Trix approach to help my special education students handle critical thinking: Think Trix, graphic organizers, and cooperative learning structures. Used together, these three strategies can be highly successful in teaching students to become independent thinkers and engaged learners. In the following sections, I recount my introduction to Think Trix, and I describe how I teach students to use the three strategies together. My story concerns elementary students with learning disabilities, but I know from other classroom experiences and from working with colleagues that the approach I describe here is appropriate, with adaptations, and effective across grade and achievement levels.

How I Began

Like many teachers, I had been using group learning and some graphic representations since my first year of teaching and I always tried to stimulate my students to think. Along the way, I learned to use structured cooperative learning and to target higher order thinking skills. My introduction to teaching thinking skills to students in a structured way came after I moved to Prince George's County (MD) Public Schools. That year, I taught fifth- and sixth-grade-aged students with learning disabilities in a self-contained special education classroom (within a general education building). My students were considered "functional": That is, they read at or below the first grade level.

I was determined to raise my students' reading levels. I began the year by focusing on literature units, as I had done previously, but I did pass out the basal reader that each student would have been assigned to, just so that they could see the books that they were accustomed to using. When I explained to the students that we would not be using these books, one of my 12-year-old students, John (not his real name), exclaimed, "Oh, good! I've already been in this book five times." The book that he held up was a first grade reader with a big floppy-eared bunny on the front cover. I was appalled that a child had been asked to repeat the same book for 5 years when

obviously it wasn't helping him. John's remark made me more determined than ever to help my students become better readers, and so we launched into our literature units—tall tales, folk tales, legends, myths, drama, and newspapers. By January, they were making excellent progress.

That year, for the first time, most special education students took the school system-wide criterion referenced tests in reading and math. Out of a possible 100, my students' scores ranged from the high teens (for a student with retardation and one with a brain injury), through the twenties, to a few in the low thirties. I had not expected that the scores would be that high, and I was pleased. We had been doing a variety of higher level thinking skills activities on a regular basis, and the students seemed to be gaining knowledge, self-esteem, and age-appropriate social skills. Impressed with their accomplishments, I looked forward to more growth during the remainder of the year.

In early March, I went to a Saturday workshop sponsored by the school system for newly hired teachers. Because I was going to a wedding that day, I had signed up for an afternoon workshop on thinking skills, assuming that I knew enough about this topic that I could leave early and not miss much. However, the metacognitive system called Think Trix, which another teacher presented that day, was so impressive that I stayed for the whole session and went to the wedding late. Think Trix presented a more structured way of approaching thinking than what I was currently using. I liked the Think Trix system of symbols as props for students learning to use thinking more consciously.

One adaptation of the Think Trix system this teacher offered was a list of words that often occur in the questions or directions teachers use with students. These words act as cues to thinking types. The standard version of Think Trix does not use cue words, other than the words that label the thinking types—*Recall*, *Cause and Effect*, *Similarity*, and so on. It struck me that being able to recognize other frequently occurring signals to thinking might be very helpful to my special education students.

I was so excited by the possibilities of the Think Trix system that when I returned to my classroom on Monday morning, I told my students that, starting that day, we were going to begin a new way

of looking at our thinking. As I taught them the symbols for the thinking types and the related cue words, I began to see changes in them and in their work. I had decided to begin using Think Trix in reading because I was most comfortable with that subject and concerned with promoting students' growth. Soon, however, the students began to use the Think Trix terminology voluntarily in subjects other than reading. They also began adding other cue words to the list for each Think Trix symbol. Clearly, they had endorsed Think Trix as a vehicle to independent learning.

The students' growth was highlighted when the school system's staff development office chose to videotape our reading lesson for a program they were producing on classroom management. The lesson involved comparing two versions of a myth we had read, using Think Trix cue words to stimulate higher order thinking. As the crew started videotaping, the staff development specialist asked if she were in the right room. "I thought we were filming a special education classroom," she said. I told her that she was in the right place, and she couldn't believe it. The crew was so impressed that they stayed for the entire 2-hour reading block and even a little of the math block, although they had expected to be there not longer than a half hour. My students were ecstatic that someone wanted to see their skills, and I was excited that our class had been compared to a general education classroom.

Other exciting comparisons awaited us. One day, as I was explaining my mythology unit to the reading specialist, she asked if she could see what we were doing. When I showed her my lessons and some of the students' work, she commented that our lessons were more complex and cognitively demanding than those in the fourth grade Talented and Gifted class. She wanted to know if she could use them with that group. Finally, when my class took their criterion referenced tests again in June, the students' scores had increased an average of 20 to 30 points. Several scored in the 80s and 90s (out of a possible 100), and the following year, some of these students were mainstreamed at grade level for various subjects.

I attribute the rapid growth in my students' skills to the Think Trix system and the activities for teaching them about the thinking types and incorporating them into our daily work. I had stumbled upon the right combination of strategies for helping my students

become independent thinkers and engaged learners: Think Trix, graphic organizers, and cooperative learning. Not only did the students have better test scores and reading comprehension skills, but there were also many other benefits—some of which could be expected, and some which honestly surprised me. I noticed:

1. Improved problem-solving skills, especially in math word problems;
2. Strengthened self-esteem;
3. More creative responses, especially in their writing;
4. Increased student independence;
5. Improved social skills;
6. Improved oral communication skills;
7. Improved oral reading skills;
8. Expanded vocabulary;
9. Improved writing skills; and
10. Better study habits.

Since that first, exciting experience with Think Trix, I have used this approach with students from preschool to graduate school with similar success. In the next section, I outline my approach to teaching the Think Trix system for other teachers who want to use these strategies to improve students' thinking.

Introducing Think Trix

Teaching the Think Trix approach to students is not difficult. Essentially, it involves teaching them to be strategic in doing something that they already know how to do: to think. At the same time, Think Trix is sufficiently complex that its elements need to be introduced carefully. Experience convinced me that it is advisable to begin teaching Think Trix in isolation from new content material so as not to overwhelm students with too much new information at one time. If your students are generally comfortable with cooperative learning and graphic organizers, then you may want to use those strategies as you introduce Think Trix. If not, then I suggest that you

not introduce all three strategies at once. I found it easiest to start by using Think Trix with cooperative learning and graphic organizers, because the students were already accustomed to using these strategies, but in only one subject area. I chose a subject I was comfortable with and one in which my students really needed to grow—reading. If you teach a single subject area, begin with one or two class periods per day.

To begin with Think Trix, first display all the symbols and tell the class that they will be learning a way to process and answer questions and to address problems in an orderly way. Post a permanent set of all the Think Trix symbols in your classroom for students to refer to, and keep a set of individual symbols on the chalkboard for daily work. I like to have a laminated set with magnets on the back so that they stick to the chalkboard. Some teachers post the Think Trix terms with the symbols and related cue words as well. Finally, many students benefit from having their own Think Strip (a long, thin laminated strip with all the symbols on it) and some black chips to place on the strip as markers (see Appendix B). As the students become more proficient with Think Trix, you may want to make a Think Wheel (a pie chart listing each symbol, with a pointer in the middle to turn to the appropriate symbol)—a large one for you, and a small one for each student.

Introduce the thinking types and the symbols one by one, using the names of the seven thinking types to help students distinguish among them. Depending on the students' level, you may want to model the kind of metacognitive processing that you expect from them: "Oh, yes. I recognize this cue word. Therefore, I know what kind of thinking is appropriate here." This modeling can teach the students to process questions strategically. Although question processing comes naturally to many students, it is difficult for some special education students and others as well. English language learners may need this kind of help. When you teach students how to identify the kind of thinking that questions and other prompts call for, they can begin to make better sense out of assignments, tests, and textbooks.

Helping students to see that the cue words signal particular kinds of thought is very important when Think Trix instruction is new. Thus, it is vital to begin with words that are clearly tied to only

Recall
What happened?
Who?
Where?
When?
How many?
Sequence
Facts
Plot
Detail

Compare
Same
Similar
Alike
In common
Analogy
Common element

Contrast
Different
Difference between
Differentiation
Distinction

Cause and Effect
What would happen if
Guess
Predict
Result
Consequence
Be likely
Motive

Idea to Example
Generalize
General to specific

Example to Idea
Summary, summarize
Classify
Specific to general

Evaluation
Rating
Value
Judgment

Figure 2.2. Cue Words for Think Trix

one thinking type. The Think Trix terms for the seven thinking types are unambiguous, and most of the other words in Figure 2.2 point straightforwardly to one kind of thinking. When everyone is quite familiar with the thinking types, you can point out that not every question contains a cue word to the kind of thinking required to produce an appropriate answer.

Recall. It might seem unnecessary to introduce Recall as a thinking skill, because students are so thoroughly familiar with doing this kind of thought at school. However, they will probably be far less familiar with identifying and asking recall questions than with answering them. Because using Think Trix involves students in asking as well as in answering, you may need to teach questioning for recall. Explain that Recall questions are the easiest kind to answer because they include the types of questions often asked in textbooks and in review sessions. Post a chart listing the term *Recall* and a few other cue words you want your students to associate with the Recall symbol and with the cognitive task of recalling. Illustrate with recall questions calling for known information and have students decide together whether each one is actually a Recall question. Get every student to respond by asking for "Thumbs Up, Thumbs Down"—yes or no.

Next, have students ask their own Recall questions on some theme, but do not have them answer the questions. Some of my students were unable to articulate and/or write appropriate questions because this academic language task was new for them. They gave answers instead of questions: For example, students would write, "My brother is 7," rather than, "How old is your brother?" If your students have trouble, simply have them rewrite their responses, if necessary, into question format, whether in class or for homework.

When you are introducing Recall, questions should not be related to a content area. They should ask for information that the students know very well, such as "How many sisters do you have?" "What is the quickest route from our room to the cafeteria?" or "Who is one of the custodians?" This exercise helps students concentrate on the kind of question being asked, not on the informational content. Working with information that they know increases students' success and reduces frustration for everyone.

Expect to encounter some minor problems. When you focus on questioning for recall, don't allow students to lose sight of the fact that the questions that they are devising are intended to get the responder to recall or identify something. Some students assume that recall questions can only request information that the questioner already knows. They may have in mind the kind of questioning that

teachers do in verifying students' understanding. Help students see that asking a recall question is a way of finding out information that they do not know (e.g., "Which way is north?"), and getting people to activate knowledge that is relevant to a current task (e.g., "How long did it take to paint the garage?"), as well as getting people to display their knowledge (e.g., "List 20 Spanish prepositions").

Another consideration is the kind of linguistic structure that can elicit recall. Recall thinking can be triggered by syntactic questions (e.g., "How many years are in a score?") and by indirect questions (e.g., "Let's see if anyone knows who Rosa Parks is"). Recall is also signaled by sentences that are not questions. Many prompts to recall thinking are directives (e.g., "List the states and their capitals"). Thus a focus on recall thinking ought to include prompts other than questions.

These details aside, most students are able to work with Recall very quickly because of their familiarity with this type of questioning and directing. Once my special education students got the hang of it, they wanted to ask and write questions all the time. You can have students practice asking Recall questions by having them conduct oral review sessions in their cooperative learning groups, make up written test questions, and supplement questions from their textbooks.

Within several days, students will probably be ready to move to another thinking type. Again, the task is not to teach students to think, but to focus them on the processes that they already use. Choice of the thinking type to teach next depends upon the subject in which you are doing Think Trix and upon the thinking types that students need the most. I introduce the thinking skills here in the order in which I have introduced them to my students. If you decide to introduce them to your students in a different order, just turn to the appropriate section for some tips. I have found that moving to Compare (Similarity) and Contrast (Difference) after teaching Recall works well, because comparing and contrasting involves Recall (remembering or identifying)—as do all the other thinking types—and because other types of thinking can involve comparing and contrasting.

Compare/Contrast. First a word about terminology: I have been using the terms *compare* and *contrast*, rather than *similarity* and

difference as in the standard version of Think Trix. If your students are very young or of very low ability, you may want to begin by using the more familiar terms *same* and *different*. *Same* is not a synonym for *similarities*, of course, but it gets at the cognitive processes involved in comparison. Whatever labels you use, you will want to introduce the terms *compare* and *contrast* at some point, because students will encounter them often in their textbooks and other classes.

I introduce the two thinking types Compare and Contrast together for several reasons. Most important, the two kinds of thinking often happen together. That is, when considering two sets of items or concepts, people may notice both differences and similarities. Then, too, though I use the term *compare* consistently in Think Trix to mean finding similarities, it often applies elsewhere to finding both similarities and differences. Finally, I found that I needed to refer to both similarities and differences when I taught students about Venn diagrams, the symbol for both Compare and Contrast thinking.

If your students are not familiar with the Venn diagram that symbolizes Compare and Contrast, show how a Venn diagram works and let students have an opportunity to play with it so that the symbol becomes quite familiar to them. Take the circles apart (using long pipe cleaners with younger students, or circles cut from colored transparencies with older ones) and put them back together to explain that the overlapping area indicates likeness. Talk about the difference in the shading patterns within the two symbols. Have the students write on the lines in the overlapping area as they compare their class to another one; compare two animals, well-known characters from television or sports, literature previously read, or popular singers; or compare two objects you show them, such as an apple and an orange, a shoe and a glove, or a computer and a telephone. Then do a similar exercise, using the non-overlapping areas of the Venn and writing out unlike characteristics. Finally, have the students work with an open—that is, unshaded—Venn to show both similarities and differences simultaneously. Appendix B includes an appropriate graphic organizer.

Introduce the cue words for Compare and Contrast in the same manner as for Recall. Whichever terms you choose for the thinking types, it is important to use the words *compare, contrast, similarities,*

and *differences*, because they occur frequently in school tasks. Once students are familiar with the cue words, continue as you did in teaching Recall, having students identify Compare and Contrast questions and directives and formulate their own. Be sure to continue to work on Recall as you teach Compare and Contrast.

At about this point in introducing Think Trix, students can begin to answer questions and apply the thinking and questioning skills to new content area information, rather than only to known information. If students are not ready to begin answering questions or formulating questions about academic content, wait until they are ready. At any rate, students should experience the academic purpose of using higher level thinking skills early in the process of learning Think Trix.

As you continue teaching the thinking types and symbols, identify terms that are not listed among the cue words but do occur in your lessons and assignments (e.g., *identify* often signals recall thinking) so that students can extend the power of Think Trix. To reinforce learning, refer specifically in lessons to all of the thinking types with which students have already worked. Students need experience with all of the skills, the symbols, and the cue words so that they build an understanding of Think Trix as a support for academic tasks.

Cause and Effect. I like to introduce Cause and Effect next. I have found it to be one of the most difficult Think Trix components for students to handle, even though they figure out causes and consequences unconsciously all the time. Expect to spend several days on this logical construct before students become comfortable with it. Cause and Effect can be introduced by using concrete, everyday examples that are familiar to students, including these:

When it snows heavily (cause), we do not have school (effect).

The result of getting your allowance or getting paid (cause) is buying a new video game (effect).

Another way to introduce Cause and Effect is with a game, "Because, Because" (Schoenfield & Rosenblatt, 1985). The game be-

gins with a single clause ("the telephone rang"). The first player adds *because* to that clause, and follows it with an effect clause, to get something like "Because the telephone rang, the baby woke up." The next player converts the effect clause into a because clause: "Because the baby woke up, the parents had to wake up." On and on the game goes in this fashion. Even though this game usually gets very silly, students can be expected to see that the second clause expresses a consequence of the first one.

Once the notion of Cause and Effect becomes salient through these activities, introduce the symbol and a few cue words. Gradually add cue words as they occur naturally in classroom activities. Opportunity for introducing the Cause and Effect cue words may arise during science or estimation lessons in math where the words *result, hypothesis, guess, predict,* and so on are useful.

Evaluation. In my opinion, Evaluation should be taught back-to-back with Cause and Effect because some students confuse these two thinking types. Introducing Evaluation through questioning will be fun for everyone; naturally, students love to ask, write, and discuss Evaluation questions when their judgments are being solicited. A good way to start is to ask students how they feel about a certain issue connected to some learning activity or class concern—perhaps a current event, or some school problem such as attendance, or even a television show if that topic is relevant. Talk about the thinking type in terms of the Evaluation symbol, which depicts weighing something to find its value. Discuss the scales of justice metaphor if it's appropriate for your class. Any group can do evaluation thinking in terms of ethical values. Mention the cue words in the same manner as with the rest of the thinking types. If your class is ready, you may choose to introduce the cue words during discussion of a story, a social studies lesson, or other appropriate lesson. For example, you could have students evaluate the ending of a story they have just read, or write Evaluation questions and answers in conjunction with a movie they have seen during a social studies unit, such as *Gandhi* or *Glory*.

Idea to Example and Example to Idea. Idea to Example refers to deductive thinking (from the general to the specific); Example to Idea

is inductive thinking (from the specific to the general). The terminology can be intimidating, but students are already good at both kinds of thought. They sort Halloween candy into fruit-flavored and chocolate categories (Example to Idea); they tell stories about what happens to bicyclists who don't wear helmets (Idea to Example).

There are very good reasons to teach these two thinking types separately; students need to understand that they are not the same thinking process. However, I teach them together because I have found that my students often use the two kinds of thinking in tandem during instructional activities. (In fact, the hypothetico-deductive method is central to scientific inquiry.) They also use the one type when I expect that they will use the other. As long as they can explain their thinking and arrive at appropriate responses, I don't criticize the kind of thinking that they use to get there.

When introducing Example to Idea, begin by having students classify items. Younger students can categorize or classify objects, such as buttons, pattern blocks, attribute blocks, leaves, or Legos. Give older students examples from their reading and have them find the unifying concept: heroines with a mission, cities with environmental programs, or prime numbers. Have students sort the items into groups and name each group based upon the general idea that characterizes it. Also have students explain their groupings, both so that you begin to understand how each student processes information and so that students can observe a range of organizing principles. After completing the activity, introduce the Example to Idea symbol and the cue words *classify* and *categorize*. The notion of symbolizing *idea* with a light bulb will need to be explained to young students. Be on the lookout for cartoons and comic strips that use this symbol.

In introducing Idea to Example, have students come up with examples of a general theme or concept that you provide. Because I teach Example to Idea and Idea to Example together, I might have my students find examples of things that are red immediately after they had classified buttons or leaves according to color. Again, show the symbol and introduce some cue words, including *general* and *specific*.

Once students have the concepts, it's easy to move into using the cue words in lessons, particularly with lists. If you list spelling or vocabulary words for the week, point out that the words are examples of the general category, words to learn this week. If students are

brainstorming about ways to get money for a field trip to the zoo, point out that ways to get money is the general idea and their suggestions are the specifics, the examples. If students are working with the character trait graphic organizer (Appendix B), help them see that they are doing Idea to Example and Example to thinking. Beginning with the person whose name is written in the center, they find specific traits of that person's character (general to specific: Idea to Example). Then they find specific events in which the (general) trait was exemplified.

Metacognition

Think Trix supports metacognition: thinking about thinking. To strengthen metacognitive awareness, I often ask my students about how they arrived at their answers. This confuses students at first, because some are not used to talking about mental processes or justifying their answers. Many immediately change their responses, assuming that if the teacher is asking for an explanation, something must be wrong. After a while, however, students get used to explaining their thinking in terms of the seven thinking types, and they even enjoy it. Think Trix terminology helps them talk about their reasoning.

Questions for eliciting talk about students' thinking include: "Why?" "How did you figure that out?" "How did you get that solution?" "Why do you believe that?" or "What did you do to get that answer?" Requests like "Tell me more about that" may motivate children to push their thinking further, and indeed sometimes to change their responses as they come to new realizations. This question would be appropriate to a student/teacher conference, but asking it in whole group instruction also gets others thinking and wanting to be involved. Having students discuss their thinking processes in the group provides a model for conscious thinking. It is important that the students hear how others use the thinking types, so that they can try alternative strategies when solving a problem or answering a question. Not only should you elicit this discussion, but students should also ask each other about their thinking. The more skilled students get at describing their thinking processes, the better they (and you) will understand how they think, and the more familiar and useful the Think Trix framework will become. By engaging

students in rich academic talk about thinking, using the common language Think Trix provides, you will guide them toward becoming independent thinkers.

Beyond the Cue Words

After the seven thinking types have been introduced with their symbols and related cue words, and students are focusing consciously on their thinking in the course of lesson tasks, improvements should appear in the ways students process information and explain thinking. They may need to practice their newly acquired metacognitive skills for quite some time before automaticity is ensured (depending on the class, this may range from several weeks to a few months), but eventually they will be able to use Think Trix with ease. Think Trix can be incorporated into instruction in additional subject areas so that students can see the broad applicability of their knowledge about thinking. For example, Cause and Effect reasoning learned in reading transfers easily to reasoning in math when the Think Trix terminology is used.

As students become more familiar with Think Trix, they may require refinements concerning how the thinking types relate and overlap. Someone will probably notice that all of the questions they compose, or you ask them, could be classified as Recall questions. All thinking involves Recall on some level, because knowledge has to be activated in order for thinking to occur. Ask students to identify how the mind works as it uses recall for different purposes. For example, "How did Cinderella feel when the clock struck midnight?" could be classified as a Recall question. Answering it requires recalling relevant details of the story, such as the fact that she knew that her coach would turn into a pumpkin at midnight. But, assuming that your version of the story does not directly state how Cinderella felt, students will have to infer her feelings (Example to Idea), based perhaps on the pictures in the story that show her running from the ball and on their general knowledge about how people feel when they're late (Compare/Contrast). Therefore, the question about Cinderella's feelings might better be identified as calling for Example to Idea, Compare and Contrast, and Recall thinking, rather than Recall alone.

Students at all levels will soon notice that the cue words do not always appear in instructions in textbooks and worksheets. Recall thinking is triggered when you ask students to list their observations during a laboratory session, but "List your observations" does not contain a cue word. (Adding *list* to the Recall cue words is not advisable, because *list* can also be used in prompts that call for comparing and contrasting.) Comparing and contrasting come into play when they talk about local issues such as whether to expand an existing high school or build a new one, along with Cause and Effect, and Evaluation. But the question, "Should a new school be built, or should the old one be renovated?" does not include a cue word. When a question or direction does not include one of the cue words that the class knows, you have an opportunity to teach them that sometimes questions and directions suggest appropriate thinking types indirectly or vaguely. I call this kind of signaling a *cue concept*: Some concepts or actions or relationships expressed in the sentence act as a cue or a clue to a thinking type, or perhaps more than one. In responding to the prompt, "Explain why snow melts," students would have to figure out that explaining the concept of snow melting calls for Recall thinking and perhaps also Cause and Effect, Compare, and Contrast. Figuring out is a metacognitive activity, involving monitoring their thought processes. When students talk about thinking in terms of the seven thinking types but without being bound to cue words, they have moved into metacognitive control.

Once your class can analyze prompts, you can expect disagreement about which thinking type is being called for. I think that these disagreements are productive and need not be resolved definitively. When a student reasonably and convincingly justifies a prompt as requiring a certain thinking type, this is evidence of metacognition at work.

To broaden students' abilities from relying on cue words to figuring out cue concepts, you can have them identify the types of questions that appear at the end of a story or chapter in their textbooks. Not only will students realize that a question can be expressed without using a specific cue word, but they may also complain that some kinds of questions are missing. Use such teachable moments to have students devise questions for each thinking type. Use these questions in a game, a quiz, a cooperative learning

activity, or to trade and answer in pairs, having the writer of the question take the teacher's role for critiquing the responses.

When students can analyze prompts and identify one or more of the thinking types as being called for, continuing to use the Think Trix symbols and cue words in class provides students a kind of security for answering questions and learning new material. Encountering questions or problems in a new knowledge domain, many students will look for a cue word or find a cue concept that helps them break the problem down into manageable cognitive tasks. By using the Think Trix symbols to encourage metacognition, you are well on the road to ensuring that students hve the ability to function successfully at school and beyond, and to join other students in the mainstream.

Think Trix, Graphic Organizers, and Cooperative Learning: A Natural Threesome

Graphic organizers and cooperative learning are natural complements to Think Trix. Graphic organizers provide the structure for representing thought visually; cooperative learning provides the social interaction to scaffold thinking. Both strategies engage students actively. Translating thought into graphic form is an activity that requires and supports thinking, but cooperative learning uses students' social interaction abilities to elicit, express, challenge, ratify, and expand thought. Other chapters focus on graphic organizers and cooperative learning, but I offer some advice here on getting started because I am so thoroughly convinced that Think Trix instruction is most powerful when it incorporates graphic organizers and cooperative learning.

Graphic Organizers

Virtually all teachers use some kind of graphic organizers to capture information—charts, graphs, and tables at the very least. These organizers and others constitute an important part of Think Trix instruction. For example, when you ask questions or direct students to analyze a story they have read, you may enter their

responses into a story map (see Appendix B), writing down students' ideas about the main characters, their problems, and the solutions. The rationale for graphic organizers should be carefully explained to students. If we teachers do not explain that a graphic organizer is a map representing analysis, how it is set up, and how it relates to the thinking types, then when we try to use that graphic organizer in another subject area or on another day, we may be met with blank stares as if the students had never seen it before. We *must* specifically teach students to use graphic organizers in a variety of contexts, and we must connect the organizers with the kind of thought they portray. Charts, for example, lend themselves to categorizing and classifying, and to generalizing (Example to Idea and Idea to Example).

An easy way to expand use of graphic organizers in the context of Think Trix instruction is to use preprinted organizers that can be duplicated for students and applied in a wide variety of contexts. Appendix B includes some; Appendix C tells where to buy some. As students become proficient at filling in the preprinted organizers, they can draw organizers themselves. Eventually, students will modify the organizers so that they become more appropriate for the types of thinking being done by the students.

When everyone is comfortable with some of the familiar graphic organizers, begin to use handmade webs (circles with spokes radiating out) for learning vocabulary words, for starting writing assignments, and for organizing data. Webs can portray Example to Idea and Idea to Example thinking, Cause and Effect, and Recall. Use words, pictures, and colors on these and other graphic organizers.

If your class is just getting started with graphic organizers, you might canvass your students about the organization visuals that they already use. Many students find that plotting out material visually makes learning complex information or large amounts of information much easier. They may already have worked out their own ways to sort information which make sense to them and might be used by others. Outlines, in all of their guises, are a kind of graphic organizer that many people use in some way.

Finally, think of filling in an organizer not as an end but as a bridge to another higher level thinking activity: Higher level thinking occurs again when something is done with the information that was visually organized. Writing a paragraph or story, drawing a

picture, discussing issues in pairs, designing a model, or outlining a project are all possible follow-up activities that use the organizers as blueprints.

Cooperative Learning

Although the teachers I know have widely divergent sets of experience with cooperative learning, most elementary teachers know something about it and use it to some extent. Chapter 6 summarizes tenets of cooperative learning and takes up some of the pitfalls and promise of cooperative learning for promoting academic talk in conjunction with Think Trix. Here I briefly describe one of the simplest and yet most powerful cooperative learning structures that fits beautifully with Think Trix: Think/Pair/Share (Lyman, 1981).

Essentially, Think/Pair/Share is a cooperative learning structure that pairs students for thinking and comparing reactions to a question or direction. In the first phase, students think individually and silently for up to 1 minute, frequently jotting down their thoughts. At a signal from the teacher, they turn to their partners and discuss ideas for 1 or 2 minutes. In the third phase, the teacher asks several students to report their pair's thinking. You can tie Think/Pair/Share directly to Think Trix by specifying the kind of thinking that you want students to do or by encouraging them to report the kind of thinking that went into their responses. You can also ask them to write their ideas onto an appropriate organizer during the think and/or pair phase.

Think/Pair/Share is appropriately used with questions that require reflection and where multiple answers are possible. For example, it might be appropriate to introduce a unit on law enforcement in a government class by asking, "Is it better to expand social programs or to build more prisons?" (Naturally, this issue will not be exhausted in one short interaction, but getting everyone to think and talk about it, however briefly, will engage students' interest in knowing more.) Once you get comfortable with the approach, it will not be necessary to plan questions in advance. They can arise spontaneously during instruction and can include questions that the students pose.

Think/Pair/Share is valuable on several fronts. First, it is a simple way of ensuring that every student engages with the instructional topic. Students will be highly likely to talk during the pair portion of the task, not because you tell them to but because the social interaction processes they have learned naturally make it feel imperative to respond to someone who has said something to them. (Of course, someone has to talk first, but usually someone will.) In addition, this simple structure does not entail a particular physical arrangement. Students need to be able to get into normal conversational distance with each other, but moving furniture will probably not be necessary. If students are already seated in pairs of desks, turning to their partners will be easy.

Think/Pair/Share is also useful as a way to move your students into other kinds of cooperative learning. An important consideration, even during your earliest experiments with Think/Pair/Share, is the composition of the pairs. You may want to start out by letting students talk to whoever sits near them, but soon you should assign pairs so that students get comfortable with each other as academic partners and can focus more on the thinking task and less on handling the social interaction demands. Think of these pairings as being permanent teams for other cooperative learning structures and tasks that take more time, and be very deliberate in choosing who will work together. Plan your pairs on paper. Typically, students who are strong in certain areas and students who are weak in those same areas should be placed together. Also be aware of personalities; use your knowledge of your students to keep apart those who will not work well together. Deciding on team members will take some time, but the investment is worthwhile because it is one of the most important steps in making Think/Pair/Share and other cooperative learning successful in your classroom.

Think Trix and its allies, graphic organizers and cooperative learning, are integral to the way I teach and the way I think about teaching. My special education students seemed to have learned that school was a place to fail, to listen, or at least to be quiet and passive. I had always tried to make school interesting and fun for my students, but when I learned to involve students more actively in their own learning through getting them to examine their thinking and

talk about it, I found myself setting higher and higher standards for their work. My students surprised me. They still do.

Investments and Benefits

A final few words of teacher-to-teacher advice: I did find that introducing and continuing to use the Think Trix approach was well within my professional reach; at the same time, I had to prepare lessons carefully as I tried out the new methods. If Think Trix, cooperative learning, and graphic organizers are all new strategies for you, then I suggest beginning with one of them and gradually adding the others to your teaching repertoire so that you do not give up on a good thing before it has had a real chance to succeed. Novice or experienced, teachers need to prepare lessons and gather materials carefully to introduce the thinking types. Later on, lesson planning will go faster. The reward will be the evidence that your students are entering into their work more thoughtfully and more responsibly.

Other Ways With Think Trix

The version of the Think Trix approach described above in detail is one teacher's adaptation. There are others. One way in which teachers differ with respect to using Think Trix is in introducing the thinking types to students. The following cases present very different methods. Two elementary teachers who team occasionally—one a self-contained special education teacher and the other a general education teacher—preferred to teach several thinking types together. A high school teacher introduced the entire typology in one day.

Taking the Plunge: Zoey and Nona

It didn't make sense for us to do Think Trix one type at a time. We were afraid that that way it really wouldn't make sense to our kids. So we started doing the thinking types pretty much together. We didn't actually do all seven of the skills simultaneously, but we did work with the first four all at the same time. We picked Recall, Compare, Contrast, and Cause and Effect. We

had tried teaching Cause and Effect separately at first, but the students put the thinking types together themselves. We went on to the other three types, teaching Idea to Example and Example to Idea together, and Evaluation last.

We had two groups of kids for this work—Zoey's special education students and Nona's third grade kids—and we would meet about twice a week. First we got the children used to the symbols, and then Zoey introduced the cue words for each symbol. Sometimes we would practice with short questions using the cue words. We gave them the symbol strips and used them for our reviews. We'd give the students the questions with the cue words and then have them point to the symbol. They got to be really good at it. When we asked a question they knew which thinking skill we were asking for.

It took us from October to December to get the kids to understand what the symbols meant and which cue words went with them. We thought they did great. We didn't think they found it difficult or overwhelming. We were even able to get them to work in pairs.

Full Force: Deborah

I like to introduce my students to Think Trix early in the school year—during the second or third week of school—so that we can use it all year long. I teach the whole typology at once because it takes forever to get through it otherwise; and there's so much to cover in a 50-minute period in high school that taking time for bits of this and that fragments my lessons.

This year, I taught Think Trix in one day, as we were analyzing Jack Finney's "Contents of a Dead Man's Pocket." After I presented the seven thinking types with their symbols, we went through all of the book's discussion questions and directions for the story and decided which kind of thinking was appropriate for answering each one. For example, one directed readers to contrast Tom's attitude at the beginning of the story with that at the end. I asked if that was strictly a recall direction or something else. The kids said that it was difference and similarity thinking.

Working through the list of questions, the students eliminated the first six as strictly recall questions and not very inter-

esting for discussion. Questions 7-11 had some meat. I assigned one of them to each student and had them figure out a response to the question themselves, also noting the kind of thinking involved in crafting their responses. Then they grouped with others who had answered the same question and compared their responses. I appointed a spokesperson for each group. That person presented the group's responses to the class, using an appropriate graphic organizer and explaining the group members' thinking. After each presentation, the rest of the class criticized the group's thinking: They found information listed on the graphic organizer that didn't really apply to that question.

In teaching Think Trix, I make the analogy of going to the mall. How do you get there? What road do you take? Is it direct? Using Think Trix helps students find the direct route—the relevant information for responding to prompts. It helps to fine-tune their thinking. They take more responsibility for their responding when they focus on what type of thinking is relevant.

Chapter Wrap-Up

Think Trix has worked for many, many teachers and students. It offers a logical approach to teaching metacognitive strategies, which are a strong focus in current curricula and performance assessment. It helps us move out of the decontextualized approach to teaching analytic skills, which has been part of the curriculum in the past, and into infusing conscious analysis across the curricular spectrum. It gives our students the power to monitor and direct their cognitive processes.

Helping students to apply higher level cognitive skills in problem solving and express themselves with ease during academic activities makes a lasting contribution. Think Trix is a tool to help you accomplish these objectives. This chapter has emphasized that Think Trix is a way of being explicit about the thinking tasks that lessons require. Ultimately, Think Trix will become an automatic part of instruction, but first you must familiarize yourself with its basics and must teach it explicitly to your students. To ensure your

students' competence with Think Trix, you may choose to introduce the simple cognitive process Recall before moving on to more complex levels, like Cause and Effect, and Evaluation. Or you may choose to start with several types at once to avoid decontextualizing any one thinking type.

To use Think Trix as a thinking enhancer and not a governor, avoid fights about identifying thinking types. When you see that a student really understands a question as involving a kind of thinking different from what you had in mind, get him or her to explain. That in itself is a metacognitive practice as well as academic talk. Correct students only when they obviously don't have a handle on the prompt. Don't rely too much on question words associated with thinking types, because the association of words and types is not fail-safe. If you do teach question words with the symbols, list whole questions. Think Trix is a tool to get higher order thinking and academic talk occurring in your classroom. We've used it; it works; and we want you to try it.

Discussion Questions

1. Which elements of the Think Trix approach are already in place in your classroom? In what ways do your students excel at using them, and where do they need work?
2. Think about the current metacognitive abilities of your students. Where would be a good place to begin using Think Trix with them? What subject or topic; what thinking type; at what point in the curriculum might it make sense to focus on thinking?
3. What thinking types have your students already worked on in other classes? How could you use their formal knowledge about thinking to introduce Think Trix?
4. What instructional activities that you have used in the past can be modified to help students focus on thinking? How can you link these activities to curricular content, once students are ready to apply the thinking types?

3

Getting Started With Think Trix

More than one teacher has discovered in the Think Trix approach a way to become a more reflective facilitator of academic language and a more effective teacher of higher order thinking skills. When you successfully integrate Think Trix and cooperative learning into instruction, you provide all your students with increased opportunities to think, collaborate, and communicate. Engaging in academic talk, your students present themselves as producers, not just receivers, of knowledge.

Keep in mind, though, that the benefits offered by Think Trix are obtained neither simply nor immediately. Because Think Trix goes hand in hand with graphic organizers and cooperative learning, the complete approach is complex. The three components must be mastered and integrated with curriculum in flexible, student-centered instruction. With so much to consider, the biggest problem often is deciding where to begin.

This chapter will address three main issues related to getting started with the Think Trix approach, illustrated with the experiences of some teachers who have successfully implemented it in their classrooms. The issues include examining your own attitudes about teaching and change, dealing with concerns about classroom management, and finding an actual starting point.

Attitudes Toward Teaching and Change: Are You Ready?

How do you feel about change? Would you like to see some differences in your classroom? Are you willing to risk some uncertainty in your daily routine for the potential benefits to your students and yourself? Many teachers are uncomfortable with the notion of significant change. Because styles of teaching are highly personal and often deeply ingrained, real change may be perceived as dangerous or threatening. At the same time, however, most teachers feel a desire to hone their professional practice and to enrich learning experiences for their students.

The Think Trix approach—the thinking types framework, used in combination with graphic organizers and cooperative learning structures—offers teachers the opportunity to substantially improve their students' critical thinking and academic language skills, as well as their ability to collaborate with others. Effective implementation, however, often requires significant changes in instructional style and organization, and even in lesson content. This approach will not be successful as an addition to your current instructional practices or as a Friday afternoon activity. It doesn't work to do Think Trix halfway—perhaps by changing the vocabulary and materials you use in lessons, maybe using the word *recall* or handing out Venn diagrams one day for students to use in comparing urban life and city life. That kind of teaching misses the basic point of Think Trix: teaching students to think strategically. Of course you can use those approaches as starters and then move on inductively, asking students what *recall* means, what they do when they recall, and how they know when they are supposed to recall. To be successful with the Think Trix approach, you need not only to desire change in your classroom, but also to be willing to let it happen fully.

Here is a story from one teacher's journey toward significant change:

In Need of a Change: Zoey

There I was, a special education teacher of language learning disabled students doing the same boring, isolated skills teaching year after year. My primary focus was on phonics, reading

comprehension, and writing skills, because I followed the pattern of my coworkers.

Yet my children were not progressing. It dawned on me that I was not even sure what "language learning disabled" meant. I took my concerns to my principal, but she told me nothing new. I left her office even more depressed. She had assured me that I was doing a good job, but I still strongly felt that I needed a change.

I decided to consult with the speech-language pathologist to gain a better understanding of just what *language* meant. I found out that language was not just about matching writing and sounds to read words. I realized that the reason why some of my students couldn't read was because they had no understanding of word meanings. If a child doesn't know the basics, how can he or she read? I thought about the backgrounds of my children. Some children come to school without much experience with reading. Some hate books, some hate to write, and some are just not interested in school at all.

I also found out about expressive language. Some children are afraid to express themselves, some are not used to expressing themselves at school, and some have not been allowed to. With this new understanding, I yearned to make some major changes that would improve my students' language skills. When I learned about Think Trix, I had already been through the mental preparation for change and was ready to give it a try.

Moving Mountains: Are You Set?

Just because you are ready for change does not mean you don't have some misgivings about it. One source of anxiety may be the newness of it all. It can be intimidating to try something new, even for very experienced teachers like Alta:

Know Your Subject: Alta

There's so much to the complete Think Trix approach—the symbols, the cue words vocabulary, the cooperative learning and graphic organizers that go with it. In the beginning, I felt

overwhelmed. Before I do anything new, I want to have an overall grasp of the whole thing and an understanding of what it can do for me in the classroom. I had to know what each of those Think Trix symbols meant before getting into teaching them. I realized that if I wasn't clear about the concepts myself, I would never be able to teach them to my students.

I thought it would take me a month to figure it all out. But I was surprised to find that it took me less than a day to understand the basics—and that's all I really needed to get going. Think Trix itself is easily mastered. Within a few hours, I was thinking up activities and games to use in introducing the Think Trix symbols to my students that would make the new approach fun for them.

In addition to teacher concerns about mastering the Think Trix typology, there is the issue of classroom management. You want to try something new, but what if the kids don't cooperate? What if you lose control? This fear commonly sabotages teachers' efforts to incorporate new ideas.

If you have ever been the first teacher in your school to introduce students to cooperative learning, you have probably faced classroom management challenges as you and your students made the transition from teacher-run to student-mediated instruction. The extent to which new problems arise when you make such a dramatic change depends in large part on the preexisting behavioral situation in your classroom. For the most part, teachers who have difficulty with management will continue to experience trouble with it when using cooperative learning (or any other new instructional approach). Those with established and effective management mechanisms in place will probably enjoy continued success, although existing management systems may need to be adapted.

Once the Think Trix approach has been established in the classroom, management may actually become a less salient concern. Students tend to become very involved in their work under the Think Trix system, so distractions are less potent and problem behaviors may be nipped in the bud by disapproving peers. At the same time, it will be necessary for you to examine and possibly revise your definition of a classroom management problem. Talking and move-

ment, traditionally regarded as problems, are vital to and often good indicators of the success of cooperative learning. The reasons for classroom talk and movement—instead of their frequency alone—should be considered when determining what is unacceptable.

Dealing With Chaos: Nona

I was always a very firm teacher. I did all the talking, and the children did all the listening. There was no movement in my class. I couldn't stand to have children talking while they worked. When doing an assignment, my children had to sit quietly and work independently. They were only to talk when I asked a direct question which required an answer. I felt strongly that I needed to be in complete control in my classroom. I was afraid that if I gave my students any freedom, the result would be chaos.

When I first learned about the Think Trix system, the whole concept appealed to me. I liked the idea of concentrating on higher order skills, and it made sense that kids would benefit socially from cooperative learning. In practice, though, I was not convinced that this was the approach I wanted to take with my own students. I was concerned about the increased noise and movement that are part of a cooperative approach. I did not want to feel out of control, and I did not want it to appear to others that I was not in control of my students. I decided to put off doing Think Trix and cooperative learning.

Another teacher in my school was using the Think Trix approach with her students and having a lot of success. There was a lot of noise in her classroom and it appeared disorderly, but her kids were making huge strides. I was finally convinced that change was worth a try.

I did not have instant success. When we first began cooperative learning, there was confusion over all the new procedures. The noise and movement increased, and sometimes tempers (mine included) were shorter. Once we got used to what we were doing, things went better. My fears had been confirmed, though; there was more noise and activity in my classroom than before. But the students became so involved in what they were learning and accomplishing that this was not such a problem after all.

Finding a Starting Point: Go!

With the three components—Think Trix itself, graphic organizers, and cooperative learning—it might be hard to know where to start. Because the Think Trix typology will be new to you and your students, it is unlikely that you will know exactly where students' current metacognitive abilities lie and thus how difficult it may be to introduce the thinking types. Fortunately, the Think Trix approach is rather flexible and there is no fixed starting point.

Many teachers have found that a natural place to start is with the cooperative learning component, even though it may take some practice before you and your students are sufficiently comfortable working together in pairs and groups that you can move to the thinking types. Other teachers have been successful focusing on Think Trix first, teaching each of the thinking types and the related symbols individually, in clusters, or all at once, as suggested in Chapter 2. Most students are already quite familiar with the notion of graphic organizers, but if yours are not, this is another logical place to begin.

What is more important than *where* you begin is simply *that* you begin using the Think Trix approach with your students. Even if you choose a starting point that is completely off the mark (which is unlikely), you will have better insight into your students' current abilities—and you will already be under way. Our recommendation is that you give some thought to an appropriate starting point, but do not dwell on it. Be prepared, but do not overplan; be ready to go with the flow. The learning process will be guided at least as much by your students as by you, so rigid, extensive planning is counterproductive.

Let's Start at the Very Beginning: Alta

> My school had just adopted a new curriculum, and I had gone to a Think Trix workshop the previous summer. I knew that I wanted and needed to make some changes in my classroom, but I was somewhat set in my ways and afraid of change. I was fearful of not being successful with my children. And I had no idea where to begin.

I had to find a starting point, so I read the new curriculum and became very familiar with the first unit. I went over the thinking types, but I was still totally confused about what to do first. I remembered that at the workshop we had learned that the Think Trix symbols represented progressively more difficult thinking. So I decided to start my children out with Recall, a skill in which they had already had lots of practice.

I began my first lesson aimed at introducing Think Trix by reading the children a story. Afterward, I introduced the Recall cue words and the symbol, and we practiced making some recall questions about the story as a class. My students did this very well. Then I put the students into groups and told them that I wanted them to work together to come up with their own recall questions using the cue words.

It didn't work! My students were confused and could not seem to get started. They did not know how to write recall questions using the vocabulary *who*, *what*, *where*, *when*, and *how*. More important, they did not understand the mechanics of working together in a group and sharing ideas. I realized that I needed to provide them with more instruction on how to work together cooperatively before I could expect them to benefit from it academically. I scrapped my original plans and used the lesson time to tell my students about cooperative learning and how to work together.

If you are charting new territory in your classroom in terms of instructional arrangements, it's a good idea to wait until everything is going smoothly before you begin with Think Trix. Strong, effective cooperative teams are a basis on which to build instructional innovation.

Chapter Wrap-Up

This chapter has focused on some of the basic concerns of teachers who are beginning to use a Think Trix approach in their classrooms. Many teachers have ambivalent feelings toward the idea of

real change in their classrooms. They want to expand their own instructional repertoire and support students' academic development, but they might be afraid of what could happen if their established patterns are disrupted. One major source of this concern lies in classroom management.

The Think Trix approach being described in this book may indeed represent a major change in instructional approach for teachers who are not using cooperative learning, and it will open the door to different management issues unless you are already accomplished in using it. Most of the commotion is temporary, but increased noise and movement are usually permanent. These are vital to the interactive nature of cooperative learning and are associated with increased student interest, engagement in learning, academic talk, academic achievement, and, somewhat ironically, decreased behavior problems.

Once you are ready to make a commitment to the Think Trix approach, it's best to choose one of the three components and get started. You will probably find that change is stimulating, that you will be able to figure out what to do next, and that your students and you will have fun.

Discussion Questions

1. Examine your attitudes toward change. What kind of changes can you reasonably expect to see in your classroom? What changes would you most like to see? What changes would be unacceptable to you?
2. Which Think Trix element will you work on first? How will you link it to preexisting elements of the Think Trix approach?
3. Can you foresee any modifications you might want to make to your teaching or classroom arrangements before introducing the Think Trix approach?

4

Planning for the Think Trix Approach

Logistics

Chapter 3 mentioned some of the major concerns teachers have when planning to incorporate the Think Trix approach into teaching and learning. We examined some of the mental preparation that teachers undergo. In this chapter, we will look at some of the practical, concrete groundwork that is necessary to ensure your success. In combination with your mental preparation, logistical planning will form a strong base on which you can build a Think Trix-based program.

Getting the Okay

One of the first proactive efforts you need to make is to secure administrative approval for your new undertaking. Even if Think Trix and cooperative learning are being used by others in your school, it's a good idea to get your principal's or department chair's endorsement in advance. An informed administrator is more likely

to be supportive as you take on your new challenge, and this support can make all the difference in the success of your Think Trix instructional program. It may be more difficult to obtain administrative support if your principal/chair is brought in after the decision has already been made and implemented.

Without prior approval, you risk eventually losing all of the ground you gain using the Think Trix approach. To experience lasting benefits from Think Trix, your students need to be exposed to the approach consistently over time. If your principal nixes the program part way through, you and your students may never profit fully from using Think Trix, and valuable instructional time will have been wasted. The case below illustrates how one teacher encountered this problem.

Putting the Cart Before the Horse: Darlene

I learned about the Think Trix approach in an in-service workshop and was pretty excited about it. Because the workshop had been organized by the school system, I didn't even think about okaying it with my principal, Mr. Bowles. I just went ahead and started using Think Trix, and my kids liked it a lot.

Mr. Bowles knew that I was doing something a little bit different in my classroom, but I don't think he knew exactly what that was. As long as I was taking the initiative and doing things on my own, he didn't seem to mind. The problem occurred when it came time for his official approval. I needed his permission to take my class into the hall to work on large Venn diagrams on the floor in groups, and suddenly what I was doing was unacceptable. I told him that I had been using what I learned at the Think Trix in-service training, and I told him how well my students were doing with it, but by then he had taken a position and was inflexible on it. He seemed angry or threatened that he had not made the original decision for me to begin the work in my class. I felt that he was taking back the control, that he was basically saying, "I'm the boss, and you will listen to me ultimately." I was extremely upset that my efforts were being squashed, and I knew how disappointed my kids would be to quit working in teams. They had made a lot of progress, but that did not seem to matter as much as school politics.

Fortunately, Darlene and Mr. Bowles did reach an agreement, and she was able to continue using Think Trix and cooperative learning with her students. Because she perceived that Mr. Bowles felt threatened at being left out, Darlene suggested that he might want to observe her students in their new instructional arrangements and provide her with specific feedback. Mr. Bowles agreed, was pleased with what he observed, and finally gave his approval. In fact, he eventually supported her efforts to train other teachers in her school to use Think Trix. However, Darlene might have avoided this difficulty altogether if she had included Mr. Bowles in her plans from the beginning.

An early endorsement of your plans is effective only to the extent that the administration knows what it is endorsing. When you go to your school administration for approval to use the Think Trix approach with your students, let them know what they're in for. Be open about the likelihood that classroom talk and movement will increase with cooperative learning. Explain how your role in the classroom will change. Think Trix with cooperative learning is not just a different way of doing things—it is philosophically different from traditional methods in which the teacher transmits knowledge. Think Trix brings thinking into the open, and cooperative learning engages students in constructing knowledge and lessons together. Make sure your principal has a basic understanding and appreciation of this difference, or you may encounter problems even after approval has been obtained, as in the following case.

A Policy of Chaos: Zoey

I had been looking for a change anyway when I attended an in-service workshop on the Think Trix approach, and I told my principal, Ms. Luther, that I wanted to give it a try. Happy that I wanted to try something I had received from staff development, she said she thought it was a great idea.

Unfortunately, I might as well have told her I was instituting a policy of chaos, because when she came by my room for the first time that's what she thought I'd done. The kids were talking excitedly in groups throughout the room. There was a lot of movement, with students getting up to locate resources or supplies for what they were working on. As Ms. Luther circulated,

she found that no two groups were working on the same thing. Worst of all, I was not leading the lesson directly or telling students to quiet down. I could tell that she was unhappy about the situation, but she walked out without saying anything.

When I saw her later that day, she said she thought things would be "more organized" once I'd had a little more practice with cooperative learning. But the next time she visited was no different—except that I wasn't even in the room. Ms. Luther told me that she didn't feel that the Think Trix approach was working out in my classroom. I said that I thought it was working very well, and I described all the skills and objectives we had covered. As I talked about what my students had accomplished, I realized that my principal didn't really know what Think Trix was or how it worked with cooperative learning. I had just assumed that because it had come out of an in-service workshop, she would be familiar with it.

Planning for Think Trix and Cooperative Learning

Teaching with Think Trix and cooperative learning structures requires professional confidence. You must be focused enough to work toward specific goals and flexible enough to allow students to help direct their own progress. You must be willing to become the facilitator of learning rather than the dictator of what is to be learned. The Think Trix approach does not adhere to the traditional didactic model of instruction. The whole point is to involve your students more in their own learning by helping them use specific analytic skills. Planning will still be important, but it will be different.

Most teachers know from experience that lesson plans are not set in stone. Even under the strictest model of one-way teaching, the reactions and behaviors of students cause frequent deviations from teachers' original plans. Teachers are constantly modifying—occasionally even abandoning—their lesson plans. So chances are that you are already experienced with some aspects of flexible planning.

When you plan to teach students about Think Trix and later on to use Think Trix as an instructional tool, you can follow the same

general procedure as for traditional instruction. Begin by identifying the goals and objectives of the lesson, then rough in the activities for meeting them. As you plan, be mindful of how and where to involve students actively in the instructional process. The case below illustrates how one teacher approaches her planning for Think Trix.

The Best Laid Plans: Nona

At first, planning was so hard for me. Before I began with Think Trix and cooperative learning, I was very much in control of the classroom and all the lessons. My students were there to listen to *me*. So my plans were very explicit and I pretty much stuck to them.

Once I started using the Think Trix approach, I noticed how much I had been doing for my students. I had a real tendency to do everything for them, to say everything for them, to answer everything for them. I had to force myself to think in terms of what *they* could do and then let them actually do it. This was very hard for me, because I did not want to give up control and I did not want my children to fail. But I found that they were more competent than I thought, and the more they were able to do, the less I felt I needed the control.

Now when I plan my day, I am very conscious of my students' involvement. I find places in all my lessons where the children can do something that I would have otherwise done. For example, I used to read aloud to my class every morning. Now, a child comes up and does the reading each day. When I write my lesson plans, I put in that the children will do certain things, to keep myself from doing everything. I have to keep thinking to myself, "Don't do it, let them do it." I feel now that my job is to provide a guideline for my students to carry out.

Transitions

An important aspect of lesson planning where cooperative learning structures are involved concerns transition time. Transitions pose challenges under any model of teaching. Students often show emotional and behavioral changes as they switch gears from one

activity to the next. Because of its emphasis on group work, transitions under the Think Trix approach can be even more turbulent. Getting activities up and running and then bringing them successfully to a close can be challenging at first when you are dealing with not only small group dynamics but also individual behavior. Advance planning of how you will deal with transitions will make them smoother.

How will you get your students' attention? With everyone spread out and working cooperatively, how will you give simple whole-class instructions such as "Go," "Stop," and "Quiet down"? Because there will probably be more noise and movement in your classroom with students working in cooperative groups, you may not be able to rely on verbal commands alone.

To solve some of the potential problems posed by transition times, teachers often use signals. Turning the lights off and on may mean "quiet down" or "put your current work away" or "I have an announcement." Signals should be agreed upon by you and your students in advance. Students should be given an opportunity to practice with the signals (this can be fun for young children in a game format) before they are expected to respond consistently. The case below describes how one team of teachers developed and used signals to better manage transitions.

Stop, Look, Listen!: Nona and Zoey

We were very excited about the idea of team teaching with Think Trix. With a total of 40 students to work with, our options for grouping were greatly increased, and we would be expanding the social and academic horizons of our students. But transition times were a nightmare. First we had to get our two classes together, then we had to split them into groups and get their activities going. At the end of the period, we had to get their attention (not as easy as it sounds), bring them out of their activities, and transition them back to their respective classrooms. The whole experience was similar to taking off and landing multiple 747 airplanes at the same time. They did great while they were in the air, but getting them there and back down again was bumpy.

There was a lot of talk when our students worked together, and we realized that when we tried to yell to get their attention, we were only adding to the noise. Instead, we used hand claps as signals to gain attention. Whenever the students heard five consecutive claps (i.e., "shave and a haircut"), they were to stop what they were doing, clap twice (i.e., "two bits"), look up to the front of the classroom, and listen. Once we gained everyone's attention, we could give them clear, explicit directions. It was then up to the individual groups to carry them out, led by their team captains. We told them how much time they had to comply with our directions, and when they had 1 minute to go, we signaled them by turning the lights off and back on. This told them that when the lights went off and back on again the next time, 1 minute later, they needed to have completed the task. (Naturally, our definition of *minute* depended on how close the children were to being finished.)

Our system really worked. The students learned it very quickly and responded very well to being given responsibility for themselves. Of course, there were kids who did not want to follow the directions, but their teammates would set them straight. Because we were wasting less time on transitions, the kids got to spend more time on their activities.

Room Arrangement

The physical arrangement of your classroom space is a small consideration that can make a big difference in your success with the Think Trix approach. As a part of planning for how you will group your students for cooperative activities, make sure your room is arranged to suit these groupings. The next case illustrates how important this basic element of logistics is, and how easily it can be overlooked.

So Many Students, So Little Space: Olivia

I was the first teacher at my school to begin using the Think Trix approach. Since then, several other teachers have also tried it. Mr. Cash was one of them, but he was having trouble. He came

to me and asked if I would look over what he was doing and help him figure out what the problem was. He told me how he had grouped his students, and he showed me some of his lesson plans for cooperative learning. Everything looked fine to me. At his request, I agreed to observe his class in action.

When I walked into Mr. Cash's classroom, I was surprised at the way he had it set up. The desks were all in rows, taking up most of the room. There were two small workstations at the back of the room, which comfortably seated about three kids each. I wondered if Mr. Cash was going to have his students move their desks around to work together, but he didn't. When it came time to get into their groups, he sent two groups of six students each back to work at the two stations, and kept a third group at a cluttered table up near the front of the room. Time was wasted as kids relocated to their group work areas, hauling materials and dragging chairs behind them. More time was lost as the students argued over who would sit where at stations that clearly could not accommodate them all. Some of the students did eventually get started on the work, but others (especially the geographically challenged) were left out and amused themselves in other ways. Mr. Cash's energy was spent navigating the rows of desks as he made his way from one group to the next, trying to get them all into the activity. It looked like chaos to me.

After the lesson, I told Mr. Cash that I thought the biggest problem with his lesson was the arrangement of his room. He looked genuinely astonished. It was clear that he had never thought of that before. He had put a lot of effort into his lesson plans and couldn't believe that he had been tripped up by something so simple. We worked together on figuring out an arrangement that would be more conducive to cooperative learning.

There is more to favorable room arrangements than just the creation of sufficient group work areas. Materials should be easily accessible by students and neatly stored. Consideration needs to be given to classroom traffic patterns. Students should be able to move around to important locations (the bookshelf, the pencil sharpener,

the supplies cabinet, the sink) and get what they need without disrupting the flow of activities.

Classroom arrangement also refers to the visual displays within your classroom. Just as the placement of work areas and resources reflects the cooperative nature of your Think Trix classroom, so should your bulletin boards and exhibits. Group work products and progress charts make excellent displays. In addition, it is important to show the Think Trix symbols themselves with the cue words in your classroom. Symbol displays are useful reminders and quick references that students can independently access. The next case describes how one teacher incorporates symbol displays into games that develop her students' knowledge and understanding of the symbols when they are first introduced.

Symbols, Symbols, Everywhere!: Zoey

At first, my students needed constant reminding about what the symbols were and what they stood for. They did not seem to retain what they had learned about the symbols from one lesson to the next, and they did not automatically infer to use the thinking strategies when appropriate, as I had hoped that they would. To them, the symbols and related words were just another piece of school work, not connected to anything else. I felt that for the symbols to be useful to my kids, they needed to overlearn them so that they could use the thinking types confidently.

I had my students draw each of the symbols on brightly colored paper, and we hung these around the room. We played a matching game: I asked simple questions with cue words, and individual students went to the symbols for the appropriate thinking type. Then we switched it around to where I would stand by different symbols and they would have to ask questions. The kids loved the matching game, especially when I hid the symbols around the room and they had to find the correct one after a question.

I passed out Think Trix strips to the students with the symbols and terms for the thinking types printed on them. The kids colored these and then taped them to their desks. We played

a sit-down version of our matching game, placing markers on the strips on their desks. We did matching of symbols and questions with cue words in every way I could think of, and my students were really into it. Once they had it down, we worked more on using the symbols and words in lessons. As the students progressed in their understanding of thinking processes, I had them use their symbol strips for short drills connected to our lessons. I would ask a question, and they would tell me what type of thinking was required to come up with the answer, referring to their strips. With the strips right there on their desks throughout the day, my kids were constantly being prompted (without a word from me) to use their thinking skills even when the lesson did not mention them explicitly.

Chapter Wrap-Up

In this chapter, we have raised some of the logistical issues associated with getting Think Trix instruction going in your classroom. First, it is important to obtain an administrative endorsement of your new endeavor. Prior approval from your fully informed principal will help you avoid later frustrations and will go a long way toward maintaining a strong, cordial relationship with your administration.

The next step involves planning Think Trix lessons. These should reflect the dynamics of a more interactive approach, with an emphasis on student participation in academic talk. Even if you postpone full-fledged cooperative learning and rely only on Think/Pair/Share, Think Trix is likely to produce more student talk—a valuable outcome that must be planned into lessons.

Finally, it is important to create a classroom environment that favors cooperative learning and reflects an emphasis on thinking. The physical arrangement of classroom furniture and materials should be carefully considered to be maximally efficient for group work. Classroom displays should also reflect your instructional approach, including exhibits of Think Trix symbols and group achievements.

Discussion Questions

1. Do you anticipate having problems obtaining administrative approval to use Think Trix in your classroom? What questions might be raised and how would you respond?
2. Think about the way you plan both formally and on-the-fly in the daily activities in your classroom. Name three parts of your classroom routine involving oral language that you could have your students take over. How will you take student participation and leadership into account as you go about planning your lessons?
3. Is the current arrangement of your room conducive to group learning? What specific changes could you make to improve it? How will you utilize your room's visual space to reflect the work in your classroom and to display your students' accomplishments with Think Trix? What other display space in your school could you use occasionally?

5

Molding Think Trix to Ages and Stages

The three interlocking strategies with which this book is concerned—Think Trix, graphic organizers, and cooperative learning—engage students of any age in constructing lessons in most kinds of instructional arrangements. Whether you are an elementary school teacher, a middle or high school teacher, or a special education teacher working in a general education class, a self-contained classroom, or a resource room, you can adopt and adapt the Think Trix approach to enhance academic talk and learning. Do you provide special services to students, such as speech-language therapy? Do you work alone? Or do you share responsibility for teaching and planning with others? This chapter outlines how Think Trix works in different settings with different ages and kinds of students. The stories show how enterprising teachers have married the Think Trix approach to their situations.

Young and Old

Many of the stories told in this book come from elementary classrooms, because the project in which the storytellers participated

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was carried out in elementary schools. However, Think Trix is powerful with older students as well. Thinking is stressed in high school curricula, but many teachers have noted that students seem to have trouble with thinking productively—doing the kind of thinking that an activity calls for. One high school teacher (Eber, personal communication) noted her frustrations with students' writing in response to prompts as they prepared for tests on written communication. For example, faced with a question such as "State one important theme in *Moby Dick* and show how the author developed it," students were inclined to summarize the plot rather than to develop an essay that cogently responded to the prompt. Concluding that students were not analyzing the prompts, she taught them to look for key words that would help them figure out what to say. Even that approach did not really solve the problem. What did help was experience with Think Trix. After she had used Think Trix in her classes consistently, students could see that a prompt such as that cited above called for recalling the themes of *Moby Dick*, weighing their relative importance (Evaluation), and then recalling examples of an important theme or idea (Idea to Example). Moreover, because they had frequently had experience in thinking through such prompts with the help of Think Trix, they knew just how to go about mapping out their thoughts on graphic organizers in preparation for the actual composing.

This high school English teacher uses Think Trix systematically, along with cooperative learning, graphic organizers, and other engaging instructional strategies, in many kinds of learning tasks. Here she describes an end-of-semester exam:

New Ways to Examine Learning

> My school system is encouraging "process exams" as an adjunct to the traditional pencil-and-paper outcome measures with which many students have trouble. To test students on their reading (e.g., *Julius Caesar, The Pearl, Of Mice and Men*), I have them work in their cooperative groups to prepare a class presentation. I find meaty questions in the teachers' guide—open-ended questions that will really engage the kids in building new knowledge. After directing them to their groups, I call the number two student in each group to select a question for his or her

group to answer. (I have the students come to me when I need to distribute materials, because it's faster that way.) Each group representative chooses a different question.

The groups begin work by selecting a reporter whose first task is to have each student sign his or her name under the question to indicate responsibility for it, in case there is ever a dispute. Together, the students decide on how to attack their question, using Think Trix as a guide. They sketch the symbols for the thinking processes appropriate to working with their question. Then each student has 3 minutes to figure out how to answer it. At my signal, they push their chairs back from the other group members to think individually. When the time is up, they "square back" (bring the four chairs together again) and share their ideas. As they do, one answer naturally builds on another so that the group comes up with a substantive, interesting response. They write the points they want to make in their oral report onto poster board graphic organizers that they select, and they draw the Think Trix symbols to show how they arrived at their ideas. The posters have to be legible from the back of the room.

Just as each student has participated in forging the response to the group's question, they all take part in presenting it to the class. Everyone has to do something. They know this ahead of time, so they often divide up the poster into four sections, one for each presenter. Someone might introduce the question, someone else might present the first two points, and so on. They know from previous experience that they should give examples and quotes to back up their ideas. At the end they have to bring it all together: summarize their points in terms of the question.

I assess the presentations, giving grades to each group and to each individual. Group grades go up on the wall so that the students can compare them to gain insight into my standards for presentations.

This story shows how a high school teacher has been able to inculcate Think Trix, graphic organizers, and cooperative learning so that her students use these strategies to good effect in demonstrating their control over literary works. By the end of the semester, they

are obviously in full control of the strategies. The teacher is able to conceptualize an exam that challenges students; engages every one of them in thinking, talking, and cooperating; and allows everyone to not only learn something new but also display their understanding.

Island Classrooms

A perplexing issue facing teachers who adopt innovative instructional practices concerns carryover: Does it work to teach students something that they will not see in other classes? This question will be answered differently, depending on the situation. The high school teacher whose story you just read was the only one in her school to use Think Trix, and her students benefited from learning it. Other teachers have confronted other problems.

Pull-Out Programs. One of the most common means of delivering special education services has been the resource room. Under this model, students with special needs are removed from or "pulled out" of their regular classes at various times during the day to be taught in a separate classroom staffed by a special educator. The resource teacher's time with students is limited, and the instruction is often only loosely related to what the student is doing in other classes. The challenge of providing resource services is finding a way to maximize learning within a constricted time frame, under a model that is fraught with transitions.

The limitations of pull-out programs may be especially frustrating to special educators who are considering a complex approach such as the combination of Think Trix, graphic organizers, and cooperative learning. On one hand, the benefits of Think Trix are compelling for students who have learning disabilities. Opportunities to apply critical thinking skills systematically and to engage in academic talk are especially important for young people with special needs, who may have been denied such activities in traditional, didactic instruction; however, Think Trix does require a commitment of time and consistency. One resource teacher was defeated by the logistical difficulties of incorporating Think Trix into her highly segmented instructional time.

Swimming Against the Tide: Anne

I was so excited about Think Trix when I first found out about it. My time with my fourth and fifth graders with mild learning problems too often consisted of a sort of study hall to catch up on the regular classroom work they had fallen behind on. This meant that my students usually worked quietly on their own for the 40-minute period they spent in my room, with me providing help as needed. I was excited to find a way to get my kids more involved in learning and to encourage their interaction as a class.

My students were very interested in the Think Trix symbols and enjoyed learning them as a code for important thinking skills. But it was so time-consuming. It was a slow process to get the kids familiar with the symbols and the cooperative group work, and they were losing the time they needed to keep up on their classwork. Worst of all, they were not getting any reinforcement in their regular classrooms for what they were learning in my room. This detracted from their retention, and we spent a lot of time backtracking. And because what they did remember was used only in my room, they came to see Think Trix as something "speddy"—only appropriate in special education. Unfortunately, this was also the perception of the regular classroom teacher of several of my students, who told one of my kids to "save that thing for Ms. Luke's room" when she saw a Think Trix symbols strip on the student's desk.

I wound up very disappointed and I gave up on using Think Trix with my kids. It was important to me that they learn to really use the Think Trix skills in their regular classrooms, but without the support of their regular teachers, it just didn't work.

The fly in Anne's ointment is a familiar one to resource teachers: isolation from regular education teachers and instruction. In principle, of course, resource teachers are supposed to plan instruction for each student collaboratively with regular education teachers; but in practice, teachers often find that they do not have time to plan together. Sometimes regular education teachers believe that resource teachers should take complete educational responsibility for stu-

dents in the particular area of disability. That kind of thinking certainly does not foster the teacher collaboration that is needed to keep Think Trix going in the resource room.

Anne's experience suggests that the value of Think Trix to students who receive only isolated, intermittent instruction in it is doubtful. The degree to which students' Think Trix instruction will carry over into their other coursework (and their lives outside of school) is an important consideration for special educators who supplement regular education programs.

Although many of the problems resource teachers encounter will be similar, every situation is different. Some teachers may agree with Anne that there is no way to effectively use Think Trix with their students. Others will find ways to bridge their instruction to that of other teachers, so that their students can benefit from metacognitive instruction. In fact, the year after Anne wrote her story, she began to use Think Trix again with students from a fourth grade teacher's class where Think Trix was also being initiated. The payoff for Anne was not only renewed enthusiasm for teaching metacognitive skills but also the professional stimulation of trying something new and powerful with a competent peer.

Turning an Island Into a Peninsula

Another infamous special education island is the self-contained classroom. Current national efforts to restructure schools and sink these exclusionary islands are using instructional strategies that accommodate students with diverse abilities, especially including peer-mediated instructional arrangements and thinking skills programs. The next story shows how two teachers—one with a self-contained class and one with a regular education class—invented their own brand of restructuring.

Two Heads of the Classroom Are Better Than One: Zoey

When I first started tinkering with Think Trix in my self-contained classroom, I talked to my good friend Nona, a wonderful third grade teacher in my school, about what I was doing. Soon she was saying, "That sounds like something *all* my kids

need." I offered to teach her about Think Trix, so that she could use it in her classroom. She suggested instead that we combine our classes and work together. Our principal gave the okay, and I was thrilled.

Before we actually put our classes together, I familiarized Nona with the thinking typology, cooperative learning, and graphic organizers. In the beginning, we spent a lot of time on planning. It seemed like there were a million little details to work out ahead of time, and always something came up during the actual lesson that we had not already thought of. We started out by putting all the students into cooperative groups to learn about the symbols. We used my special education students as the experts in each group, to help us teach the symbols and what they stood for. It was a great opportunity for my kids to shine, and they really loved it.

Teaming has had great results for everyone. With two of us in the classroom, we can get more accomplished. We have more ideas together than when we work alone. I don't feel so isolated anymore. Our students have really bonded as a group and have learned to work together despite their various skill levels.

Teaming. As Zoey and Nona have found, teachers who team often enjoy increased creativity, flexibility, and professional stimulation. Recently, increased attention has been focused again on the team teaching option for the delivery of integrated curricula. With the current shift toward greater inclusion of students with disabilities in the mainstream, the time is ripe for new, more diverse teams of teachers. The following case illustrates how two specialists unexpectedly combined to provide comprehensive instruction to one class of special education students.

Out of the Clinic and Into the Classroom: Owen

I teach special education in a self-contained classroom, so I tend to be isolated from other teachers, doing my own thing. A number of my students had been receiving speech-language services outside my classroom several times a week. I was never sure what went on in these sessions, but I assumed that it was

fairly removed from academics. I was surprised when Mrs. Drayton, the speech pathologist for our school, asked to confer with me about the content of our respective classes.

We ate lunch together the next day, and Mrs. Drayton told me about a workshop on Think Trix that she had attended. She explained a little bit about how it worked. She wanted to incorporate Think Trix into her instruction with my students and wanted to know what I thought about it. I told her I thought it was an interesting idea, but it sounded like a lot of work, and I wasn't sure I wanted to get involved with it myself at that time.

I found out that Mrs. Drayton was going ahead with Think Trix without me when I began to hear my students using some of the Think Trix terms—Recall, Example to Idea, and so forth. They also started to ask me if they could do assignments together—not just helping each other with reading or checking worksheets, which I had always encouraged, but doing one worksheet per pair. At the same time, Mrs. Drayton began bringing in graphic organizers that my students had done in her classroom. Pretty soon I was won over, and she and I decided to start teaming up and using Think Trix in my classroom with all my students during the time she would normally take just a few out for speech.

Mrs. Drayton wanted us to plan together, but to tell the truth, she's more of a planner than I am. What eventually happened was that Mrs. Drayton would catch me in the hall or come into my room a few minutes before our class time and tell me what she had planned. We would quickly confer about who would be doing what, and then we'd do it. I never would have guessed that I'd be teaching with a speech pathologist, but our partnership works. My students really enjoy lessons with two teachers. I've found myself doing things in my classroom I never would have thought up by myself—like the day I played Santa Claus and answered students' questions about life at the North Pole. I appreciate having the perspective of another professional in my classroom. I've been able to organize group work that is closer to actual cooperative learning than what I'd done before, thanks to Mrs. Drayton's modeling.

Owen's story makes the point that strong partnerships can be forged between the unlikeliest people and can come about in unusual ways. You do not necessarily have to team with another science teacher, or another eighth grade teacher, or another elementary teacher, or even another teacher at all.

But what if you can't find a good partner, or you don't want to? Teaming is not the only way to avail yourself of colleagues' expertise and emotional support. The next case describes how one self-contained special education teacher used peer advice to modify her classroom and her instruction.

Getting Her Ducks out of a Row: Renee

My students have a variety of fairly serious learning problems. Most of them are highly distractible and have difficulty speaking and writing. I wanted to encourage them to communicate more in class, but the traditional, teacher-directed methods I was using didn't support that very well.

I liked the idea of Think Trix because it represented a new format for teaching important skills in a way that fostered classroom interaction. I felt that my students would be more interested in what they were learning if they were more involved in it.

I have to admit that I fell flat on my face when I first tried using Think Trix with my students. I introduced the thinking skills and the symbols, but it just didn't take. Hearing my tale of woe, another teacher offered to come in and take a look at my class in action (or non-action, as the case was at the time). Ms. Johnson observed what I was doing and then told me, "Renee, you need to work on the way your kids are grouped before you go further with Think Trix." I was very surprised by this, because I had worked so hard to team my students up in ways that I thought would maximize their performance. Now that they had been working together for 2 weeks, I was hesitant to scratch it and start over. Ms. Johnson also told me to reconsider my room arrangement. I had it set up so that students sat in rows until it was time to work together, at which point they would move their desks around into groups. Ms. Johnson thought it would encour-

age the students to think and act as teams if they were permanently arranged in pairs.

I was dubious about Ms. Johnson's suggestions, but I gave them a try anyway. I wound up trying two more plans for grouping my students before I hit on the one that worked. Although the noise level went up after I took my students out of rows, they did start to work together more productively and more smoothly as teams.

Collegial support can be invaluable, whether it comes about as part of formalized coaching relationships or casually as a result of spontaneous arrangements made over lunch. Instructional strategies that radically alter classroom arrangements, such as cooperative learning does, really call for institutionalized professional development delivered regularly over many months. If that ideal is not available, however, regular consultation with peers who are successfully using this approach, who are amiable, and who are committed to pursuing excellence can offer high quality, caring feedback and support to the novice.

The Think Trix School. A common theme across successive attempts at educational reform has been the need to reduce the isolation of teachers in their classroom islands and the related fragmentation of students' educational experiences. The traditional high school pattern of students cycling through separate classes in the content areas has been criticized as artificially disconnecting knowledge that is naturally linked. Schools have tried team teaching and flexible scheduling to overcome this dispersion of information into the separate disciplines, but the familiar high school patterns are hard to overcome. In fact, they have seeped down into elementary schools, where even first graders may be regrouped for reading and math.

The Think Trix approach has a role to play in schools' efforts to integrate students' learning experiences. When most teachers include Think Trix in their instructional mix, students are able to make quick connections between the task at hand and an appropriate way to think it through. Referring to the thinking types within class discussions and other learning activities across the curriculum, teachers can encourage students to integrate new knowledge with

prior knowledge, including that from other classes. A unified approach to the process of thinking and talking about disciplinary knowledge suggests to students that school is about the process of learning, not a "facts factory."

When a teaching staff of a school is sold on Think Trix as an important vehicle to promoting thoughtful student response and unifying instructional approaches, they need to plan ways to ensure some consistency across teachers. This goal may mean some loss of individual teachers' prerogatives to modify the ways of using Think Trix, but it will also mean that teachers will share the responsibility to teach the typology to new students and to apply it so that it generalizes to students' independent work. In a middle or high school, a group of teachers might be tapped to present the typology to students—perhaps the social science teachers or the English teachers—but every teacher will reinforce it. When all (or most) teachers are referring to specific thinking types during class discussions and in assignments, students can be expected to apply higher order thinking in every subject easily.

Chapter Wrap-Up

This chapter has presented some stories about using the Think Trix approach with various levels and in various service delivery systems. The expert high school teacher's success with integrating Think Trix and graphic organizers into exam tasks accomplished in cooperative learning groups shows that it is quite feasible to use Think Trix even if no one else in your school is doing it. Students who have learned to use the approach as thoroughly as her students did can take it with them into other learning situations.

There may be a few practical problems associated with utilizing Think Trix in very fragmented instructional settings, such as the special education pull-out class. The solution to this problem may well lie in partnerships of various kinds with other teachers, or in large-scale rearranging of teaching and learning situations in which Think Trix is one of several instructional strategies broadly implemented in the school.

You know best the needs and strengths of your students, as well as the parameters of the educational structure in which you work. It is with this individual classroom situation in mind that you must ultimately determine the best route for you and your students to move into structured work with higher order thinking.

Discussion Questions

1. What experiences have you had doing or seeing team teaching? How did the team operate? How would your ideal team operate? What aspects of team teaching appeal to you? What concerns do you have about teaming? Of all the professionals in your school with whom teaming might be a possibility for you, who would be your first choice, and why? How might teaming benefit this person as well?
2. How would Think Trix and cooperative learning work with teaming?
3. How could Think Trix be invited into your school on a large scale? Are your colleagues using cooperative learning well enough that an introduction to Think Trix could presuppose cooperative groups? If not, how could Think Trix come before cooperative learning? Who would introduce the Think Trix typology and its use, and how would professional development continue across time so that everyone got really comfortable with it?
4. In what ways does your teaching situation resemble those presented thus far? Do any serious challenges arise for you in adopting the Think Trix approach? Ask your partner for suggestions, and figure out who else might help you.

6

Thinking and Talking in Cooperative Learning Groups

Cooperative learning and Think Trix are mutually reinforcing in terms of enhancing academic talk and engaging students in learning. Cooperative learning arrangements provide the social structure so that students have someone to talk ideas over with as they learn together; Think Trix provides the cues to get thinking and talking going. Although you could do Think Trix without cooperative learning, the potential for interactive richness in the cooperative group means that Think Trix can become more powerful.

Chances are that you're already using cooperative learning to some extent in your classroom. Many state and local school systems have endorsed cooperative learning, sponsored professional development, and organized curricula and assessment that incorporate it. But unless you're a cooperative learning devotee who keeps up with advances in research and practice, there's always more to know about this method of instruction. This chapter reviews some of the important underpinnings of cooperative learning, tying in Think Trix. If you have not already been introduced to cooperative learning in any depth, we urge you to read up on it, using the reference list in Appendix C to get started.

The Essence of Cooperative Learning

There are five interrelated basic elements of cooperative learning: positive interdependence, face-to-face interaction, individual accountability, interpersonal and small group skills, and group processing (Johnson & Johnson, 1989). Positive interdependence is achieved when the teacher establishes a system of shared goals for group members, joint rewards, shared materials and information, and assigned social roles within the group. When groups are structured around positive interdependence, students need each other to succeed in completing the group's task. Consider the job of dramatizing a scene from *A Raisin in the Sun*. Students must work collaboratively if the task is to be accomplished. They must decide in advance on who will play which role, where the scene will begin and end, what props they will use, and who will gather them. Because what each character says depends on what the previous one said, students must coordinate their lines as they do their play. Always in cooperative learning the tasks are structured so that students help one another, seek help from group members, and allow ideas to evolve through interaction.

Two of the basic elements of cooperative learning are directly concerned with academic talk. Face-to-face linguistic interaction is one of them. Members of a group need to sit facing each other within conversational distance so that students can construct their group learning tasks through academic talk involving all group members. Out of this practice, students gain proficiency in social interaction skills, another basic element of cooperative learning. The communicative competence that children acquire naturally through repeated cooperative learning experience stands them in good stead throughout their lives. In fact, these are just the skills that corporations have been demanding from school systems.

Students will need help with some of the communication skills for collaborating effectively with other students. Some of the role-related social skills, such as leading the group or recording ideas, may be new or sufficiently different that you will have to actively teach them through role play or example and provide many opportunities for your students to practice them. Students will also need help with handling decision making and with conflict management;

here, too, direct instruction is necessary. Group processing, another of the five basic elements of cooperative learning, is crucial to learning these skills. At the close of each cooperative learning activity, take time for groups to discuss how well they are achieving their goals concerning social skills as well as their academic skills, and insist that students not perform this task perfunctorily. You can provide feedback to the groups, but encourage them to self-evaluate too.

We do not want to suggest that group process ought to be your only concern when your students do cooperative learning. We focus on the interactive element of cooperative learning because the basic goal of our work has been enhancing students' academic language skills—skills that develop through student-centered academic interaction. Individual accountability is also a key element of cooperative learning. Every group member is responsible for his or her own learning in the group; in fact, a successful group outcome depends on each member taking this responsibility seriously.

Making Cooperative Learning Work

A teacher has two major areas of responsibility in leading cooperative learning activities, one concerned with academics and one with social interaction. Academic leadership responsibility calls for formulating instructional objectives, planning appropriate learning activities, and being available as a resource as students work cooperatively. Fulfilling this responsibility becomes easier as teachers become adept at designing group work, but the responsibility is always up to the teacher. Taking leadership responsibility for social interaction in cooperative learning involves making informed decisions about group size and membership, teaching students to fulfill various roles assigned to them, and monitoring group process to ensure that all students participate and respect each other's participation. Once groups cohere and students understand what is expected of them, the monitoring role predominates. As you become expert at leading cooperative learning—and this takes about 3 years for most teachers—the academic and social responsibilities combine.

Your role will be to facilitate learning as groups work through their tasks, making sure that the learning environment is conducive to effective collaboration by attending to physical arrangements, keeping an eye on any groups that seem to be foundering, leading the wrap-up reporting from small groups to the whole group, and adding your view to their evaluation of their own performance when you provide closure to the activity.

Many teachers who have tried doing cooperative learning have encountered disappointments. If you are one of them, we want to encourage you to keep working at it. Cooperative learning has been shown again and again in research to promote academic gains, especially for the highest and lowest achieving students. Done the right way, cooperative learning provides the academic social interaction to enhance individual learning that children do not have in teacher-centered instruction. Cooperative learning puts children in social circumstances where they must do academic talking. We offer some advice for those who are beginning cooperative learning and those who are still experimenting with it.

Tip One: Move Deliberately. We have found that the best route to using cooperative learning arrangements successfully is to introduce the approach incrementally and carefully. Even if your students have worked in pairs previously, be prepared to do groundwork with your students on how cooperative learning groups work. Talk with them about the theory of cooperative learning, just as you talk about the theory of Think Trix. Talk to them about the practical aspects of it. There's a lot for them to learn. Encountering cooperative learning for the first time, students may experience a clash if they are accustomed to the rules of the silent classroom. They will have to be convinced that not only is it okay to talk, but that that's exactly what they're supposed to do. At the same time, talking is to be academic, topic-related. Other rules change, too. Giving a fellow student the answer when working cooperatively is not cheating. Group members need to learn how to work as a team toward a single purpose by building on one another's strengths, rather than working competitively against one another's capabilities. They need to learn to create a climate in which each individual is stimulated to put forth valuable contributions.

Tip Two: Give Careful Thought to Group Membership. Start by placing students in pairs; don't let students choose their partners. Pair students who aren't either good friends or mortal enemies and who have different strengths and weaknesses. After a shakedown period, pair membership should become permanent for the duration of the group's life together (i.e., a year or a semester, depending on the grade level that you teach). The pairs will have to make efforts to get along because they are in a "sink or swim" situation. They will have to draw on each other's strengths to complete their work. Later on, when you combine pairs into groups of four students, plan carefully again for the best mix of needs and personalities. Because all teammates are required to contribute to group work and to ensure that everyone on the team knows the lesson content, team members will have to get along. Learning to work within a heterogeneous group is an important outcome of cooperative learning. Here's what Zoey learned about team make-up:

A Good Idea Made Better: Zoey

When Nona and I first introduced cooperative learning to our combined classes, I would randomly assign groups. I had eight sets of flashcards with numbers from one to five. After I finished instructing the class, I would shuffle the cards and each child would come forward and pick a card. That number determined which group he or she belonged to that day. The only rearranging I would do was to make sure that each group had one of my special education students, because I wanted all Nona's students to get to know all my students. However, I didn't send the same child to the same group every time.

Well, I thought we were doing fine. I thought Nona's class had such few opportunities to interact with students from other classes that giving them a new member of their team every time would help them make new friends. Then I realized that Nona's students weren't making any efforts to get to know my kids because they were always working with a different one. I also noticed that her kids were making deals so they could sit with their own friends. This obviously wasn't working. How were they ever going to learn to build teams if they just sat with their friends and didn't work with any new people?

> So Nona and I sat down and assigned groups. We talked a lot about each student to decide which group he or she would fit into, depending on who else was in it. They've been working in these groups for 6 months now, and I've seen some really good sharing going on. They're teams now, and my kids fit right in. Yesterday I watched a team assign roles. Two members got to pick a role and then the rest voted. The one who got the most votes got the role. And one of my special ed kids was voted a captain. At the beginning of the year, that would never have happened. He probably wouldn't even have picked the role for himself.

Inevitably, difficulties arise with respect to the pairs. Some are practical: For example, what happens to teams when one member is absent? What if your class has an uneven number of students? What happens when you get a new student? Situations like these actually provide new possibilities. Students can work in threesomes for short periods of time, but because pairs are better, one of the three is likely to get left out. However, if you add the partnerless student to the pair with which he or she normally works in a two-team group, the likelihood of productive interaction is greater. Another alternative is to split another pair. If some of your pairs have been having serious problems working together, you might want to give them a respite by asking them to split off and work with unassigned or temporarily unpaired students for a while. (However, it's not a good idea to give up on pairs before they have had time to work on their problems.) On some occasions, you can take advantage of a student's temporary availability as a singleton to conduct a conference.

Difficult social situations sometimes arise. Students may offend each other because they smell bad, for example, or because something else about them is unappealing. Personal characteristics that might be ignored from a distance may become intolerable to partners. Because teachers are usually aware of these characteristics, the potential problem can be taken up before fireworks begin. In really difficult situations, someone at the school should already be in contact with the family, and the student should be working on the problem. Your efforts to help this student socially can focus on the cooperative learning setting where social interaction is crucial to learning. You might want to negotiate personal goals for each day,

through occasional conferences, informal chats, and a dialogue journal in which you and the student write to each other. To some extent, every student's social persona is open to comment as the group evaluates itself. Personal nitpicking can be discouraged by attention to group process, but students also need to become aware of how their social habits figure in group work. Striking this delicate balance is a class project.

Tip Three: Teach Group Interaction Skills Explicitly. It's tempting to try cooperative learning by slightly altering the familiar social arrangements of individual learning, perhaps by putting students in pairs and telling them to help each other with individual tasks. This doesn't work because the social skills for doing individual work are quite different from those for addressing a shared goal. Students will have to learn these skills if they have not already done so. If it falls to you to teach the group-functioning skills, address them a few at a time; prioritize them. What do you want students to learn first? If you assign roles, you will have to discuss their responsibilities, but you will also give each student a specific set of social functions to try out. Something as simple as sharing one set of materials actually presents some challenges. Some students may need to learn how to ask appropriately for them. Use short, familiar academic tasks at first so that everybody can focus on mastering the ways of cooperative learning, and be sure that each pair produces only one academic product so that the task requires interaction. Modeling the desired behaviors is a good idea; show your students what you want them to do. Perhaps you and an assistant (or a colleague, your principal, or even one of your students) can role-play a cooperative learning activity. Consider developing a list of group functioning guidelines with the class, based on their experiences in the groups. Work inductively, asking students what skills are important in their group work. Doing so shows them both that they are developing relevant knowledge and that you value it. The time and effort spent on training students to work cooperatively is well worth the effort, because a smooth transition from teacher-centered teaching to student-centered learning demands that students become adept at group learning. Eventually you can give lesson instructions and social interaction instructions together.

Tip Four: Stand Back. Once you've given clear instructions for the group activity, intervene as little as possible during group work to allow groups to resolve any difference among themselves first. You will have an opportunity to provide feedback during the evaluation at the end of the activity. Feedback should be directed toward a group, not an individual, and it should be very specific. Resist the temptation to visit groups. You'll learn to listen across the room to what groups are doing. When you're in a student group, you change the interactive balance. The point is for students to learn to manage their own learning. Sit on the sidelines and visit groups only when they need you to help clarify.

You want to prevent the students from asking you questions that you had hoped they would find the answers to themselves. A simple way to do this is by enforcing a "three before me" rule. Students must consult three sources of information—their teammates, a solution book, the library, class notes—before asking you. Let them know that they must list the sources they used and that you will aid them only if the rule has been followed. Students will soon learn to appreciate the contributions of their teammates.

Tip Five: Keep on Keeping on. Don't give up prematurely. Starting small and slowly will help a great deal toward achieving success, for both you and the students. Maintaining a log of your efforts to use cooperative learning can help you spot the gains you make along the way. Praise your students frequently (but only when their achievement really warrants it)—and give yourself a pat on the back just as often. Get peer support from another teacher who can coach you, or whom you can coach.

Here is an example of how a special education teacher initiated her students into cooperative learning in simple sequential steps, following the tips just given:

A Fun Thing to Learn: Kay

Because I teach a class of students who are low functioning, I introduced them to the basic principles of cooperative learning very gradually. I rearranged my class seating so that my students would be grouped into two work teams. Then Ms. Peters, my

classroom assistant, and I role-played working cooperatively. I wrote some very basic rules on a chart. Because my students don't read, I read the rules every day until they had memorized them. After that, I had a different student "read" them every time we did cooperative group work. Soon they began to remind each other to "help your teammates" and "take part in the activity."

At first, I used cooperative learning only for nonacademic activities, because I thought that would help them concentrate on the social skills that have been a focus in our class all along and not get sidetracked by the task. I'm sure the fact that the tasks were fun activities made a difference in the way they responded to cooperative learning. They thought it was a fun thing to learn.

By the end of the year, my students were functioning as teams—sharing material, assisting each other with their work, and cooperating completely on tasks such as clean-up. I extended this team approach to the home living area where we worked in cooking teams. Each team was given utensils, ingredients, and a recipe. Under adult supervision, the team members worked together to make something they could all enjoy.

Group Structures and Individual Roles

Sometimes teachers say that they've been doing cooperative learning for years but calling it something different. Cooperative learning is not a new name for group work. Cooperative learning is usually highly structured, and that's one of the keys to using it effectively.

Obviously, the group unit is a crucial aspect of cooperative learning. The social and academic benefits of cooperative learning depend on strong group cohesion, which you will want to nourish. Group identity can be reinforced by having the members select a name for their group. Sometimes competition between groups inspires camaraderie within groups, but competition should generally be de-emphasized in a cooperative classroom. You can facilitate team building by using some physical strategies as well. You can give only one copy of the materials to each group, or you can choose to

jigsaw the materials so that each member has a vital part of the group's resources. Both of these techniques will encourage students to ask and collaborate.

Kinds of Groups. Each student in your class should belong to a permanent pair that will have frequent opportunities to work together, especially in Think/Pair/Share, described in Chapter 2.

You will also want to combine pairs so that you have permanent groups of four. To the extent possible, each group should have both boys and girls of different ethnic origins, ability levels, ages, temperament, socioeconomic backgrounds, and so on. These permanent "home groups" of four students gather together automatically whenever you announce a cooperative learning task.

Other structures for cooperative group work involve students moving out of their home groups temporarily to work with students from other groups. Jigsaw is one that can be used across grade levels (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978). It involves dividing up some instructional material, such as an essay, into four sections and making each member of the home groups responsible for one of the four sections. That is, the number ones from each of the groups have one section, the number twos have another section, and so on. First, everyone becomes familiar with the section assigned to those with his or her number. Second, new groups form, made up of those who have responsibility for the same section (all the ones are together, as are the twos, and so forth). In these "expert groups," students share their understanding of the section. Finally, everyone returns to their home groups to give an expert report on his or her section, in turn. Because each home group has an expert on each section of the material, each group member has access to expert help.

Finally, students will sometimes work in their groups and then report to the entire class. This structure is appropriate when teams have had different, complementary tasks for a whole class activity. For example, during a forensic science lesson, each group might have examined different evidence: hair, fingerprints, and so forth. The findings of each group are important to the next step in the lesson, questioning the suspects.

Individual Roles. One way to make group activities work and encourage interdependence is to assign roles to the group members, such as facilitator or captain, recorder or reader, researcher, encourager and praiser, materials keeper, timekeeper, accuracy coach, and so on. Just make sure that each role requires talking about the group task. The tasks associated with each role need to be specific. For instance, if you choose to have a praiser or encourager, it might be worthwhile brainstorming for words of praise and encouragement that these members would actually use. Members must be clear about the responsibilities connected to their roles. Encourage the students to come up collectively with descriptions of these jobs. Until students are familiar with the responsibilities, it's a good idea to have them review the job description once roles have been assigned for a particular activity.

Cooperative Learning Activities

How do teachers design truly cooperative activities for cooperative groups—activities that get everyone contributing to the central task? Assigning roles for activities is part of the answer because it means that no group member can hang back. You won't have to invent cooperative task structures out of thin air, however: Cooperative learning has been around long enough that many activity structures have been invented and found to work well. If you've been to cooperative learning workshops, you've no doubt learned some of them. An excellent source of information about cooperative learning structures—both activity structures and group structures—is Spencer Kagan's *Cooperative Learning*. (See Appendix C for details about ordering.) Once you have tried different structures, you will have a repertoire that works for you and your students, from which you can draw again and again. You'll also read about new structures in the professional literature, borrow them from other teachers, and make up some new ones yourself. We review one cooperative activity here, Think/Pair/Share, because it is so useful in Think Trix classrooms, so easy to use, and so safe for teachers who are introducing cooperative learning.

Think/Pair/Share

Think/Pair/Share is a simple process, but a powerful one in terms of getting frequent, extended academic talk and higher order thinking from every student. It requires that students listen while the teacher poses a question that requires some deliberation. The teacher may identify a type of thinking or leave that to the students. Students are given time (perhaps 15 seconds) in which to think of a response individually and to jot it down. The teacher cues them to pair with their partners, discuss their responses briefly, and note them on a graphic organizer, after which individuals may be invited to share the pair's responses with the whole group. Time limits are set for each step in the process. Teachers use a variety of cuing devices, such as hand signals or claps, bells, and signs, to move students from mode to mode.

There are many advantages to this structure. Think/Pair/Share is easily introduced when students are just beginning to do cooperative learning in pairs because it can be incorporated into teacher-led instruction. It is linguistically compelling. Students cannot opt out of speaking to their partners. It gets students into the habit of producing academic talk in a safe, nonpublic way and lets them know that their talk is crucial to the lesson. It also has academic value. Because students get time to think before responding, the proportion of inappropriate responses is reduced and the quality of answers can be high. It increases on-task behavior because it requires everyone to perform. Think/Pair/Share is student-centered. The signals get students' attention without teacher talk. Think/Pair/Share has other benefits for the teacher, too. When students work in pairs, you get a chance to observe their reactions, even if you can't figure out what everyone is saying, as well as time to think and to concentrate on asking higher order questions.

Even though Think/Pair/Share is simple, we don't want to claim that it will be a surefire success the first time you try it. It's important to establish a physical situation that encourages eye contact between pair members. As the case below illustrates, it helps to spend some time telling your students what your expectations of them are and what sort of behaviors they will be expected to demonstrate or learn.

Starting on the Wrong Foot: Opal

Having used Think/Pair/Share successfully with my primary speech-language therapy groups, I wanted to try it with my intermediate groups. I thought the strategy could be easily transferred so that the older students could benefit from the peer/peer involvement of this approach, too.

Unfortunately, things did not work out as I had planned. We were working on vocabulary linked to the city and its landmarks. I wanted the groups to use Think/Pair/Share to generate attributes of the words they were learning. When I explained the strategy, the students were interested in the signals associated with the Think/Pair/Share process but were less than thrilled about working in pairs. These students do not relate well in general, with much tattling and rivalry as standard operating procedure. They did not quite know how to work together to reach common goals. This problem concerned me, but I felt it was worth pressing forward. I really felt that cooperative learning strategies had the potential to serve both the academic and the social needs of these students.

Looking back, I realize that I should have gotten pairs established before I tried Think/Pair/Share. I think that some of the students felt that the linguistic demands of the task were too much and gave up too easily, and others felt the procedure was silly and didn't take it seriously. The students needed more than an explanation of the strategy to make it work. Once I modeled it with a student teacher for them and they could see how it actually worked, they began to use it more appropriately. Over time, using Think/Pair/Share routinely helped to build pair solidarity.

Managing the Cooperative Classroom

Let's face it. When students are actively involved in constructing their own knowledge and their excitement builds up, things can get a little loud. On one hand, that hum of activity is something to be proud of: It's the sound of academic talk and learning. Nonetheless,

you don't want things to get out of control, nor do you want to shout the students down. There are some ways to keep that talk at a decibel level that won't bring in the principal.

When you want student attention and you don't want to shout to get it, try a zero-sound signal, like flipping the lights off or doing a special hand clap (as Nona and Zoey suggested in Chapter 4), raising your hand, using a timer, ringing a bell, or counting down. That is their cue to produce a specific response: look at you, raise their own hands, pass the signal along quietly, stop talking and moving about, and give their full attention to you. Establishing these classroom routines is a necessary prerequisite for cooperative learning.

Students can communicate in other ways than speaking. For instance, during group sharing times, build in alternate response modes, such as having students show thumbs up for one answer or thumbs down for the other. Have them record answers on charts, overhead transparencies, or the chalkboard. This tactic helps visual learners, provides variety, and handles duplicate answers while allowing students to build on one another's ideas.

Some teachers do not permit students to leave the room for drink or bathroom breaks during cooperative learning work because leaving the group diminishes its power. This rule reinforces the general notion that cooperative groups make social and academic demands on every student, and that everyone is responsible to the other group members. This rule applies even when the group's work is finished.

Always keep "sponge" activities on hand: worksheets, a shelf of books that you change frequently, story tapes or books on tape at a listening station, computer games, a thought for the day to be discussed, and so on. However carefully you may have predicted the length of an activity, some groups may finish before the others. Rather than leaving them to their own devices—a surefire method of producing noise and losing control—you can use the sponge activity to soak up that extra time. These short fillers need not have any relevance to the previous tasks. Keep them simple to avoid being called on to explain directions; their only purpose is to keep students meaningfully occupied for those last few minutes.

Finally, be alert to the need to continue focusing on social skills explicitly even after your class has been doing cooperative learning

for a while. The most common social skill problems that can hinder cooperative learning are loud talk, interpersonal conflict, and poor collaboration. You can choose to have two objectives to every cooperative learning lesson you plan: a social skill objective and an academic objective. Or you can choose a social skill for the week and focus on it during each cooperative learning activity you do that week. Or you can do both: choose an ongoing skill-of-the-week as well as a specific skill for some or all of the lessons. Role-play and role modeling are effective means of teaching appropriate social interaction. Depending upon your students' verbal skills, academic ability levels, and social skills, you may need to design a script that matches their needs. If you find yourself having to role-play an entire sequence of the activity with an assistant, showing them how to request politely, praise, disagree politely, and resolve conflicts, don't worry and don't give up. Cooperative learning is a lot different from the individualistic learning that your students may be used to.

Chapter Wrap-Up

We've reviewed some of the benefits cooperative learning can offer you and your students. Cooperative learning teaches students skills for interdependence. They learn what may be new social skills for engaging with academic topics, helping and being helped, sharing ideas and information—the skills necessary to collaborate effectively with others in a school, and later in a work setting. At the same time, because cooperative learning also emphasizes individual accountability, students are responsible for their own learning as well as that of the group. A teacher's role is to facilitate the development of positive interdependence by formulating academic objectives in terms of one group product, structuring the task, making decisions about group structure, and monitoring and evaluating the groups.

By introducing cooperative learning gradually and explicitly teaching the desired social skills, you increase the likelihood of its success. Think/Pair/Share is an easily applied cooperative learning technique that links nicely with Think Trix and increases students'

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academic talk. It can be used to transition students from working independently and quietly into working in pairs.

Discussion Questions

1. Where in the curriculum could you be using more cooperative learning activities? Think about some of the whole-group lessons you have taught recently. Could you have used more cooperative learning activities? What structures would have worked for the task and your teaching situation?
2. What resources for learning more about cooperative learning are easily available to you? How can you take good advantage of them?
3. If you've been doing cooperative learning, which social skills do your students still need to acquire? How could you address those needs in new ways, directly or indirectly?

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7

Visualizing Thought

Graphic Organizers

From the earliest stages of introducing Think Trix, it's important to talk with your students about thinking as a strategic process. Instead of exhorting them to "Think! Think!" or "Put your thinking caps on," you can guide them to specific sorts of thinking. A concrete tool for helping students with this task is graphic organizers—shapes that incorporate the products of thinking. Graphic organizers "provide a visual, holistic representation of facts and concepts and their relationships within an organized frame" (McTighe, 1992, p. 183). If you're like most teachers, you've been using some kinds of graphic organizers throughout your teaching career, at least graphs, charts of various kinds, and outlines. You probably won't need to be convinced to use graphic organizers with Think Trix because you already know what they can do for teaching and learning. This chapter takes a look at how graphic organizers can work conveniently and effectively as a thinking aid.

Giving Shape to Thought

Graphic organizers provide the visual framework for both stimulating thinking and representing it. Calendars are one example. They allow you to write down obligations as you think of them, and their form encourages you to link crucial bits of information—the appointment, a date, and a time. But their form can also jog your memory or inspire you to fill in the blanks. A weekend with nothing written in raises possibilities: Should I clean the garage or go fishing?

A crucial element in the value of graphic organizers is that they portray relationships among bits of information. One of the most useful organizers for all ages, the web, shows the general concept written in the center circle and subsidiary items on the rays fanning out from it. Primary teachers use the web to teach sound-letter correspondence. A web with *Ff* written in the circle and *feather, frog, fancy, far* written on rays can be expanded by the young learner with examples of the general category, words that begin with *f*. The task of filling out the web leads the child in Idea to Example thinking. The completed web, hanging on the bulletin board in the classroom or in the kitchen at home, gives evidence of the child's having related sounds and letters.

Graphic organizers serve many purposes. They are good for stimulating thinking during brainstorming sessions in groups or whole class sessions, where students throw out ideas to be written on a web or simply listed on the blackboard or a flip chart. If the group is figuring out how *A Raisin in the Sun* could have ended differently, phrases could be listed; if they are recalling countries in the Southern Hemisphere, a list or a web would serve. Graphic organizers model specific types of thinking. They are useful in promoting thinking and showing the results of thinking. Thus the Venn diagram can help students figure out how sonnets are like haiku and how the two forms are different, and they can display this information for others to see. Graphic organizers can help students clarify thinking through organizing what they know about a topic—and often, in the process, extending their thinking as well. When the organizer you use is appropriate to the type of thought you're asking for, it can serve to support learning in somewhat the same way as oral language does: In giving tangible form to thought, the learner refines it.

Choosing a Graphic Organizer

Although graphic organizers are familiar as a type of teaching tool and thus easily adopted and adapted, it's important to suit them to the task. This story shows how well-chosen organizers can support thought and link learning activities:

Frying Some New Worms: Gloria

When my class started reading *How to Eat Fried Worms* (Rockwell, 1973), they liked it so much that they wanted to just keep on reading without stopping for comprehension and analysis activities, as we usually do. I convinced them, though, that loving a book meant knowing the characters so well that you'd be able to predict what they might do. We wrote stories, based on what we had learned about Billy in the first few chapters.

To get the students ready to write, I passed out character trait organizers to each student and gave them a few minutes to develop a preliminary character sketch by listing adjectives on their graphic organizer. They worked on it individually, looking back into the story to remind themselves of what they'd already read.

Next I shifted the students into their regular cooperative learning groups. Using the adjectives on their individual organizers as a starting point, the group members talked about Billy's character traits with the goal of producing a group character traits organizer. They had to agree on four adjectives, and then they had to write down events that revealed those traits. There was some arguing during this discussion, but eventually each group came up with adjectives that made sense. When they were done, each group taped its map to the blackboard, and one by one the group leaders reported to the class on their adjectives and events. To keep the activity moving, I told them not to repeat other groups' events, but they could report different events for other groups' adjectives. Everybody listened, although they were at least as interested in having unique answers as in hearing what others had to say. Everyone mentioned that Billy was courageous, but they also came up with a good range of adjectives.

The next day, we used the character traits organizers to write stories about what the kids thought might happen to Billy in the story. I put these stories into my students' folders, and after we finished *Fried Worms*, we talked about why the story hadn't turned out the way they had predicted it would.

Gloria's use of the character traits organizer was quite productive. In asking each of her students to list adjectives, she had everyone analyzing the main character, rather than just the few who might respond to a whole-group question. Thus, the graphic organizer stimulated academic talk in the groups. When students got to the writing assignment, which can be tough for some, they had already thought about the character individually, talked about him with informed peers, participated in justifying perceptions about the character, and listened to what others thought. Furthermore, because the graphic organizers were posted around the room, students had access to anything they had forgotten. Yet because the writing assignment asked for each student to build on the group's character analysis, each of them was taking a further creative step. Gloria used a simple, preexisting graphic organizer to give her class a language-rich experience, both spoken and written.

Here's a case where the organizer was not well suited to the task:

Let's Web It: Marie

Webs seemed to me to be such a simple and useful organizer that I began to use them often with my second graders. I drew them on the blackboard and filled them in with students' responses to my questions, and I sometimes had my students make their own webs.

I tried webs as a pre-writing strategy for "story writing"—actually, rewriting. One of the ways that I've always taught literacy skills to my reluctant readers is by having them rewrite stories that I've read to them, usually several times. After I had read a story, I would ask the students to recall the story's events and then write the story in their own words. I began using webs for the retelling activity. I required the children to tell me the events in sequence, and I wrote them on the rays going off from the center of the web where the title of the book was written.

> But it didn't work. Students would give me events in the wrong order and I'd have to squeeze them in. I couldn't write everything they said, because there wasn't enough room. I'd find myself writing at awkward angles, and students wouldn't be able to read my writing. Webs just didn't work for me.

Marie's problem with webbing resulted from selecting an inappropriate graphic organizer for the task. Her inclinations were good: She wanted to help students recall the events of the story as materials for their own stories, and she wanted to help them understand that sequence is important in narratives. But although webbing is useful for thinking about parts of the whole, it isn't the best organizer for showing sequence. Marie could have stuck with webbing, accepting students' story event responses in any order. Then she could have asked them to work in pairs, rearranging the events in sequence on a second graphic organizer, probably a flow chart (see Appendix B).

Marie's case shows how important it is to choose the right graphic organizer for the type of thinking and the academic task. Venn diagrams are, of course, perfectly suited for comparing and contrasting, the thinking types that they symbolize, but for other thinking types, the symbol does not function as an organizer. The symbol for Cause and Effect suggests that effects can become causes of further events, on and on, but it does not allow representation of this notion. Cause and Effect thinking can be captured in a web or in a tree roots organizer, which allows nicely for cause and effect complexity. (Draw a trunk with a couple of branches above ground, and roots or branching roots below ground. Add branches as needed to show multiple, linked causes and effects.) It lets students show that more than one cause leads to related effects.

Integrating Graphic Organizers Into Instruction

As with Think Trix, it is quite important to deliberately plan for the use of graphic organizers in teaching and learning. Otherwise, these powerful tools will be relegated to a decorative function, and you may gradually abandon them instead of incorporating them into

your instructional repertoire. We have some suggestions for cementing them into place.

A crucial element in using graphic organizers is explaining that they support thinking. Each time you introduce a new organizer, show students how to use it. You may want to laminate a large display copy for repeated use, or draw the organizer on the chalkboard, or use the overhead projector or projection panel. Explain how the organizer works—how to use it as a cognitive aid, where to write on it, and what sort of information to include. As you demonstrate its use by having students respond to questions or directions, write what they say onto the organizer. If you take care to enter their answers verbatim, your students will learn that their unique responses make appropriate entries for organizers, and that their participation is valued. Even after students are familiar with the organizers, continue to mention why you chose a particular one for the task; explanations will help them see how thinking types and organizers are connected to each other and to the tasks they do.

You can use graphic organizers across the curriculum in reviews of reading, preparation for writing, brainstorming for any class project—anytime you want to help students marshal their ideas. They are particularly useful for connecting learning activities, as Marie realized (even though it didn't quite work out for her) when she linked reading and writing through webbing. Graphic organizers can record group discussion for reporting to the whole class. Discussion is important, fun, and useful, but it's ephemeral unless someone's taking notes for use in reporting. Because graphic organizers provide something tangible to work with, they can function as analytic notepads that become the core for another activity.

You can use graphic organizers in presenting a lesson to activate prior knowledge and show how central points are related. Students can use them to engage with lesson tasks individually and together. Sometimes teachers use their students' graphic organizers as a means to evaluate learning. If students use a graphic organizer after reading or discussion, you can easily ascertain whether they have understood the material by looking over their organizers. Because they show a holistic view of students' thinking on the task you assigned, you get far more information from glancing at organizers than from hearing students respond in turn to comprehension questions. An

activity done in cooperative learning groups or in pairs can involve individuals writing on a graphic organizer before, during, and after the group activity. You'll be able to check individual accountability for group work by looking at the organizers.

Besides being useful across the curriculum, graphic organizers are fairly easy to integrate into instruction because they are somewhat similar to the worksheets that most teachers are accustomed to using. Much like worksheets, they're inexpensive to produce; they can be used to extend and check learning; and they can be used individually as well as in groups. Unlike most worksheets, however, they are open-ended and thus they stimulate thinking. Worksheets with blanks to fill in provide a great deal of scaffolding for student thought. Graphic organizers provide support, too, but students have to figure out what information is relevant, what the connections are, and what is connected to what.

Be cautious in using graphic organizers, however. Because they fit so well with established classroom practice, there's the danger of misleading yourself into believing that you're using an innovative metacognitive approach when what you're doing is just substituting one piece of paper for another. To make sure that your students will get a good return for their investment in graphic organizers, ask yourself:

- Exactly how will this organizer be used?
- How does this graphic organizer extend students' cognitive experience with this lesson?
- Does the organizer match the kind of thinking that I want my students to do?
- Is this organizer appropriate for the academic material?
- What do I want my students to write on this organizer?

When you carefully match organizers to analytic tasks and academic topics, they play an important role in your instruction.

Graphic organizers have many functions, and you will find yourself using your favorites again and again. Don't overdo any one of them. Your first clue that you've gone overboard will be some comment like, "Not another web! We're sick of webs!" Better to keep

searching for new ones than to find that you've run a really useful one into the ground.

When students are using graphic organizers with ease, they will be able to select the appropriate organizer for a task independently. When they reach this stage, you and your students can invent new organizers as well. One way to do so is by working backwards—from the information bits to the relationship among them. Write down responses to a question on a blank chalkboard or sheet of paper and then draw an appropriate shape around them, perhaps adding arrows and lines. The task of representing connections is itself a metacognitive task.

Using Graphic Organizers With Nonwriters

Obviously, graphic organizers are valuable tools for students who can read and write with ease. But what about pre-readers, students who are not good readers and writers, and students who do not read and write English well? How can graphic organizers be meaningful to them?

Graphic organizers have been used successfully with students at many ability and achievement levels, though of course in different ways. They're actually a terrific way to get reluctant writers to use written language, because organizers are often used instrumentally rather than as end products for display. In story and composition writing, form becomes important at some point. In writing on organizers, form is unimportant to getting ideas down. Writing in short bursts on organizers may be easier for students with low literacy skills than writing the full sentences and paragraphs necessary for texts. Here two teachers describe how they helped their students improve their reading and writing skills by using graphic organizers with them.

All the Words Are There: Opal

Some of my kids don't know all their letters and can't write their own names, but they're learning their letters through writing on graphic organizers and through pair work.

Whenever I start a new unit, I take the time to write out all the words that I think the students might find unfamiliar. As I

introduce them to each word during the course of the lesson, I put up these labels on the walls.

Right now we're doing a unit on insects. I put up lots of pictures of insects (from *Ranger Rick* magazines) on the walls, and they're all labeled. I told my students, "Okay, work with your partner and name six underwater insects on your web. Can you think of some? If you can't think of some, where would you go to find out?" They know the answer. Whatever they want, the picture and the word are there on the wall.

It might look like I'm doing everything for them, but you need to show them. Because they're using graphic organizers, they're working on their own. They're learning how to write letters and how to write from left to right. I know we're always being told not to be so directive, to allow kids more creativity. Creativity is there once you know what the boundaries are.

Graphic organizers are very useful for students who think that they can't write text:

Sketching Out Some Ideas: Edith

It was tough to get my kids started writing. I had to get beyond all the "I can't do it" and "I don't get it." Using graphic organizers as a starting point made a huge difference. At first I assigned one and later I gave them options from among several appropriate graphic organizers. They would sketch out (sometimes literally) their ideas in response to a comprehension question, rough in thoughts with words or phrases, and then go back and form complete sentences from these fragmented ideas. Finally, they would put all their sentences together, and voila—a complete, concise paragraph in written response to a question.

Writing can be so tough to teach that this method was a lifesaver for me. The graphic organizers seized kids' interest to get them going (far more so than the blank page, daunting even to Hemingway) and gave them a leg up to eventual success at a complex task. They felt good about their abilities and increasingly confident about answering comprehension questions. I made completing a graphic organizer a required step in writers' workshop.

There are other ways to use graphic organizers with nonwriters, poor writers, and English language learners. You will probably use them often in cooperative group work and when you do, you can assign the best writer to be the scribe. This tactic means that other group members don't have to wait too long to get their responses recorded. Sometimes you'll do the writing on the chalkboard or the large organizer. Sometimes you'll give your weak writers graphic organizers when you're sure that they'll want to write on them. When you do, you'll accept invented spelling and/or encourage them to get help. And sometimes you'll have students place realia on the organizers or draw pictures:

Comprehension Pictures: Edith

> Ernesto, a fourth-grade English language learner, was very tough to understand and not skilled in reading and writing. He was also disruptive. The only way to keep him in check was to keep him entertained, and this was rarely achieved via bona fide school work. But I had him work with a partner reading the same novel as the other kids in his group. Ernesto would draw pictures of the chapters' main events and them paste them onto boxes in a large flow chart. This drawing was relevant to the lesson, but it also kept him engrossed. Finally, he would report orally to me or review for the class what had happened in the chapter, using his completed graphic organizer. His ability to present the information clearly and in proper sequence improved a lot, and he seemed to really benefit from work related to reading that was apparently above his English proficiency level.

Such strategies are appropriate across the grades, wherever writing is a barrier to reporting thought.

Chapter Wrap-Up

Graphic organizers help students extend and organize their thought through writing. Although you may sometimes use graphic organizers without specifically mentioning the Think Trix thinking

types, graphic organizers go hand in hand with that metacognitive framework because they encourage the user to focus on kinds of thinking. They offer a reliable way of ensuring that teaching and learning don't deteriorate into unrelieved skills instruction and that students are doing something more than recalling. They link learning activities. Students will take independent ownership of graphic organizers once they understand how they can serve as note-taking and analyzing tools. Students with limited reading and writing skills can be moved toward independence through graphic organizers because the sheer amount of writing is so much less than in producing texts.

Discussion Questions

1. Which graphic organizers work well with your students? Why?
2. Which worksheets that you have used recently with your students could be replaced by a graphic organizer? Would a graphic organizer have been better than the worksheet? What sort of social interaction structure would you use them in—individual or group work?
3. Do you keep graphic organizers in your room for students to select when they need them? If not, would this help them? Would it help you? Where would you store them?

8

Melding the Think Trix Approach and the Curriculum

Introducing the three elements of the Think Trix approach to learning—Think Trix, graphic organizers, and cooperative learning—is vastly different from actually using the approach in teaching and learning. In teaching students about the strategies, most teachers use some activities that are good for team building but are not strictly curricular. But you and your students can't focus on team spirit exclusively for long. You have a curriculum to present, and every instructional minute counts. How do you move from teaching *about* Think Trix and cooperative learning and graphic organizers into teaching *through* them? Should you discard the fun, team-building activities that your students have enjoyed, or can you use them to teach the curriculum? How does the Think Trix approach reinforce curricular goals? This chapter addresses these questions.

From Special Event to Instructional Approach: Planning Is Key

To keep control of the Think Trix machine, it is important to plan for the kind of thinking that you want from your students during

instruction, and to make thinking tasks very clear to students by referencing the thinking types. Just as soon as you think your students can apply the thinking types to learning tasks, plan them into instructional activities. Whether you begin to do that gradually, proceed thinking type by thinking type, or wait until your class has learned to use all of the types, it's important that you gradually and systematically move into using Think Trix in lessons, and that you use it often. Here's a case where that didn't happen:

Could We Start Again?: Karen

> I found it very difficult to sustain interest in Think Trix after a while. When I first introduced Think Trix to my students, using the activities I had learned in workshops, the children enjoyed themselves and I thought they had learned to use the thinking skills. Evaluating the situation now, though, I would have to admit that I hardly ever use Think Trix in my classroom. I often bring in graphic organizers and I have my students do Think/Pair/Share, but I really don't have my students work in permanent pairs, and my applications of the thinking skills are very limited. Perhaps if I had fit Think Trix into the curriculum right from the start, I would be using it more systematically and regularly now.

What's interesting about this case is what Karen doesn't tell us. There's no suggestion that she planned how to use Think Trix instructionally or that she made sure that students knew how to participate in cooperative learning. She does use graphic organizers—but as the previous chapter pointed out, graphic organizers are relatively easy for teachers to use because they can take the place of the familiar (and often less cognitively demanding) worksheet. Using graphic organizers doesn't call for changing social interaction structures, as cooperative learning does, and it doesn't require that students take a new role in instruction, as using Think Trix does when you have students build questions for themselves and one another. You can use a graphic organizer on Monday without stopping to think about how it fits into your overall instructional goals for the class.

It can be hard to change teaching methods with which you are very comfortable; if you're new to teaching, it can be hard to try

something so different from that which has been presented to you as normal instructional methods. It can be hard to make lesson plans that spell out the cognitive skills your students should apply—especially if you've become so familiar with the curriculum, the textbooks, the materials, and the school calendar that you can plan globally to "get through" instead of planning lessons in detail. But having begun with Think Trix, you owe it to your students and yourself to give it a fair shot, something that Karen didn't really do.

The Think Trix approach offers you a way to teach that promotes student engagement in thinking and in the social interaction that makes up lessons. In many ways, the Think Trix approach is a substitute for some traditional teaching methods, but it does not require that you discard ways that work for you and your students. Using it does not mean that worksheets are out and graphic organizers are in; that direct instruction is replaced by cooperative learning; or that students will never do independent seat work. Using the Think Trix approach—or any new method—means that you will have to think carefully about when to use which strategies, based on the teaching/learning objectives for particular students and lessons. Think Trix should not be a special event, nor should it replace everything you're used to. It means refining your planning to take thinking into account, thereby increasing your instructional repertoire.

Did I Do That?: Reflective Teaching

The complement to planning is evaluating. Keep track not only of what you've done with the Think Trix/cooperative learning/graphic organizers way of teaching, but also of how well the method is going. Some of us wrote notes to ourselves in our plan books: "Try again with (*story X*)." "Some kids don't get Example to Idea." A couple of us kept a computer journal. We didn't write every day, but we did try to make ourselves write at least once a week about how it was going. The point was to reflect on what happened in the lessons we planned. Because we learned Think Trix as part of a research project, we had the researchers and trainers to talk to about our teaching; those of us with other Think Trix teachers in our

buildings talked about our successes and failures together. Reflecting on teaching helped us see more clearly what we were doing. Here's an entry from Darlene's journal as she was beginning to use Think Trix:

I Learned Because Think Trix Was Fun: Darlene

My primary speech-language classes have been working on writing complete sentences. At Thanksgiving, I decided to use a modified version of the game "Because, Because," both to get my students to write complete sentences about "Why I am thankful" and as a strategy to introduce Cause and Effect. The sentence-building game involves using another person's clause to build a new sentence. Every sentence starts with *because*. We practiced orally before we wrote. When someone said, "I ate too much turkey," the next student said, "Because I ate too much turkey, I fell asleep." The next sentence picked up the new clause and added to it, "Because I fell asleep, I missed the football game." The students really liked the game, of course, and by using it in the context of a curricular area—writing—I made learning fun for them.

I found that this strategy was a great way to get kids to incorporate the complex sentence in their writing. I didn't have to explain to them about independent and dependent clauses, which is really too abstract for them. They generated complete sentences, some of them very touching. One student wrote, "I am thankful because my mom loves me. My mom loves me because I am nice and I help her."

The biggest benefit of introducing Think Trix in this way, however, was one I hadn't expected. It turned out that it reinforced self-esteem. Later the same day, I asked a "silly" prediction (Cause and Effect) question of one of my intermediate classes to end the holiday week. The question was: "If you were the Thanksgiving turkey, how would you feel?" It took a while for them to get into the spirit of the question (at first they looked at me as if I had truly lost my mind). Then the students began to give funny, creative answers, such as what a nice suntan they could get in the oven. They seemed to really like the fact that any related answer was acceptable and that their responses mat-

tered. They enjoyed being allowed to think in a fun way at school, of all places.

Darlene had been using traditional teacher-led instructional techniques, with the adult as the gatekeeper of classroom talk. Reflecting on what happened when she began trying some new methods for getting students to talk, she saw results beyond what she had planned. She was encouraged to keep going.

Think Trix Across the Curriculum

A convenient, efficient aid to using Think Trix comprehensively is the Think Trix matrix, shown in Figure 8.1, which lists the thinking types on one axis and focal points—topics on which lessons traditionally focus—on the other axis. The matrix shown here is relevant to literature. Teachers and students can use the matrix to focus analysis in an academic activity. Take setting of the story as an example. Each of the seven thinking types can be applied to this one focal point. It's easy to ask recall questions about the setting but not so easy to ask an Example to Idea question—which might explain why that kind of question is rarer. However, using the matrix can stimulate teachers to push literary discussion in more interesting, thoughtful directions. Recall questions have their place in checking comprehension ("What were the settings in this story?"), but so do Example to Idea questions ("What kind of settings dominate in this story?"). This question assumes comprehension of the literary work at hand and triggers a search for background knowledge from previous lessons about how authors use a variety of means, including setting selection, to create themes. The matrix can provide discipline for teachers and students to stimulate thought and motivate extended student discourse, because tasks calling for higher level thinking tend to connect knowledge bits in unique ways. Chapter 9 has more to say on the question-producing power of the matrix.

Think Trix can be integrated into instruction in every content area; it's just a question of changing the focal points on the matrix to match the subject area and the lesson that you are teaching. For

The framework of thinking may be visualized as a matrix with one axis representing the categories, or focal points, and the other axis representing the thinking types, or thought processes, involved. This framework is useful for reminding teachers and students of questions to ask and types of responses to make. The focal points below are examples of what is appropriate for reading/literature and may be changed depending on content area or learning objective.

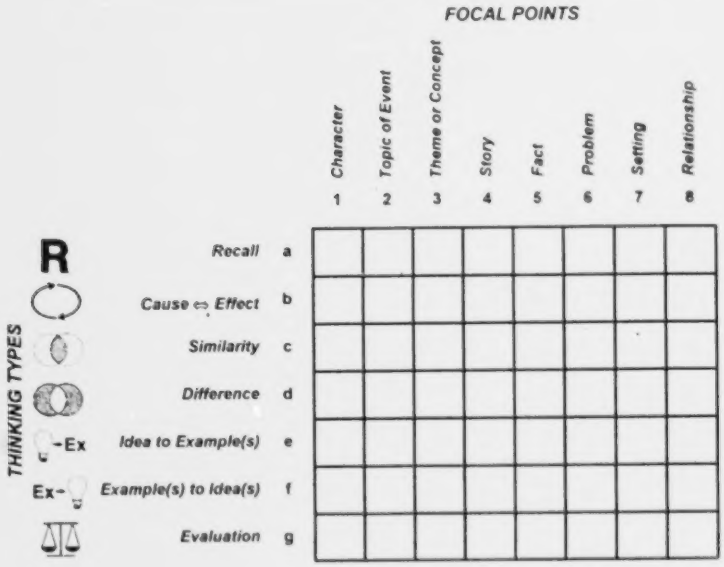

Figure 8.1. Think Trix
SOURCE: Lyman (1992, Figure 11.1), reprinted with permission of the Teachers College Press, and McTighe and Lyman (1988, Figure 4), reprinted with permission of the Association for Supervision and Curriculum Development, copyright 1988 by ASCD, all rights reserved.

mathematics, the focal points could be number, set, operation, algorithm, relationship, property, problem, and concept or rule or theorem. In social studies, the focal points could be person, event or fact, place, story or event, concept or theory, culture, problem or conflict, and relationship. Person, object, environment, event, phenomenon,

system, concept or theory, and relationship could be focal points for science (Lyman, n.d.). You may choose more specific focal points, depending upon the content area and the objective of your lesson. Students can participate in modifying the matrix categories to fit the task at hand. Working in pairs, students can make up questions relating to a unit or a lesson or a text for presentation to other students.

Regardless of whether you work with the matrix, you can certainly use Think Trix in all subjects. Below, a teacher describes her early experiences in integrating Think Trix into her grade school curriculum.

Contented With the Contents: Zoey

Many of the activities and materials that demonstrate how to use Think Trix in the classroom are generic; they were purposefully not developed for any one particular subject area. I found that I could use them just the way they were constructed, but in that case, the activities would have little relevance to what I was teaching the students in academics. Of course, my kids would enjoy playing the games, but I realized that if I wanted to integrate Think Trix into my curriculum, I would have to put academic content into the activities as I found appropriate.

Once I started, I discovered how easy it was to make the adaptations to suit the curriculum. I used the Think Trix cues with some introductory activities that I had learned. For instance, one of the activities showed how to introduce Recall by asking our students questions like, "What is your favorite color?" and "Where do you live?" I took the symbols, the notion of recalling, and the *wh-* cue words and put them into academic contexts. In language arts, I told my kids a story. Then I asked them such questions as, "Who lost the golden key?" and "Where did the story take place?" In science, we conducted a simple experiment with water, and I asked them to recall the sequence of steps. I found myself asking questions in which I cued thought types, pointing to the symbols and having students work with graphic organizers. That made my teaching and my students' thinking richer.

Integrating Think Trix, Cooperative Learning, and Curriculum

Think Trix, graphic organizers, and cooperative learning combine within many academic contexts in any kind of class. Student pairs can use the Think Trix matrix to prepare questions for other group members during a social studies lesson on ancient Egyptian social order. You can use a jigsaw arrangement to work up review questions about the acts of *A Midsummer Night's Dream*, using the Think Trix matrix. Students can use Venn diagrams in pairs in science, working on questions that you pose. Your students can brainstorm individually, in pairs, and in cooperative learning groups to analyze text, get started with their writing, act out a play, solve a math problem, or do whatever needs to be done. Varying cooperative learning structures and matching them to school tasks makes maximal use of the Think Trix approach, as the case below indicates:

Getting It Together: Opal

I am a speech-language pathologist who prefers to teach language to kids in the classroom rather than pulling them out. This way the whole class gets the benefit of additional language instruction, and the kids who are supposed to get speech don't miss parts of the class routine. I've arranged with the classroom teachers to get an hour every week, rather than the usual two half-hour sessions, for my activities. I'm responsible for teaching the curriculum, but I make sure that my first priority is language.

This year I decided to concentrate on science. I picked some units that I believed would help teachers and students focus on the children's language. I kept asking myself how I could integrate the language goals that I need to teach into the regular curriculum. Think Trix was just the tool I needed to make that bridge. It really helps me to develop thematic units that cut across different ability and grade levels so that I can adapt lessons. I look at all these regular curriculum science units, and I say, "Wait a minute. Are there any common ideas?" From the big picture, I pull out what I want to focus on. For instance, I did insects this year. Insects live in families. Insects have homes.

Insects have body parts. These characteristics of insects are concepts and vocabulary that I need to address.

A theme like insects cuts across levels, but I still had to accommodate diversity instructionally. My special education kids and my regular education kids were all working on insects, but with every class it was a different level, using different materials, using different books, or using them in different ways. I was able to use the Think Trix approach with all levels. You can find similarities and differences by using pictures or narrative descriptions and focusing on habitats or physical structure or whatever. Whether the subject is insects or something else, you want to get kids to think and read and manipulate and write and interact. No matter what the material is, they're going to think if you help them to do it.

Combining Think Trix with a whole lot of oral language instruction worked out really well. We do all the practical things; we use Venn diagrams; we use Think/Pair/Share. We have webs and other graphic organizers. Kids label their answers according to the types of thinking skills they used. The focus on language and science gives them their content. In my opinion Think Trix not only made the combination possible, it made it richer.

Opal's case is complex. She's combining Think Trix, graphic organizers, and cooperative learning in delivering speech-language clinical services with the regular curriculum within regular classrooms—and loving it. Opal is a planner and a reflector. She's always open to professional challenges, especially those involving applying innovative instructional approaches to practical school situations.

Chapter Wrap-Up

Incorporating the Think Trix typology and matrix with graphic organizers into your curriculum and using them within cooperative learning structures will require planning and commitment. It will take you a while to replace some familiar structures of teaching. But

with careful planning, the time and discipline to reflect, and support from others who are trying the same approach, you will be able to use the practical teaching props that Think Trix and graphic organizers provide to stimulate higher level thinking in your lessons. The student participation inherent in cooperative learning will mean that responsibility for using Think Trix will be shared by everyone, and everyone will engage in thinking and thinking about thinking. You are the leader but not the only thinker. The flexibility of the Think Trix approach makes it available for multiple curriculum tasks.

Discussion Questions

1. Is there a curriculum area that you feel you've been neglecting? Could Think Trix help? Could this area be integrated with other areas of your curriculum or with other content areas through Think Trix-based lessons? Could you do thematic units with interdisciplinary work, using cooperative learning groups?
2. How could you vary the way your groups use graphic organizers so that they are useful in various curricular areas and tasks? If you have been using them in groups, consider whether that seems to be working. Does everyone contribute, or does the scribe also do all of the thinking?
3. Evaluate your use of the symbols. Do you regularly use them to cue thinking? Are they posted where everyone can see them? Do the students refer to the symbols or mention the thinking types without your cuing?

9

Talking Smart

Literate Talk and the Successful Student

The Think Trix approach to instruction contributes to many educational foci. Skills in higher order thinking, social interaction, and academic language are directly, explicitly taught as teachers teach their students how to do cooperative learning and how to use the Think Trix typology. As you use the Think Trix approach systemically along with other instructional strategies, students hone those skills. This chapter focuses especially on academic language, echoing some points from Chapter 1 that may ring more true after you've worked with the Think Trix approach.

Talking Smart

Warren Simmons, of the National Center on Education and the Economy, speaks of the ability to handle academic language with ease as *talking smart* (Simmons, personal communication). He tells about sitting in university classes and being impressed with fellow students' erudite sounding contributions to classroom talk. Dr.

Simmons knew that these students were basically no smarter than he was, but they knew how to talk smart—how to talk in classes in ways that were very different from the ways the same students talked in more relaxed settings of everyday life. He concluded that they'd had the advantage of growing up in middle-class families where they learned to display their knowledge when asked to do so. By modeling their ways of talking, he learned to talk smart and went on to participate comfortably in graduate school and to be at ease in addressing large audiences.

This book started off with the observation that oral language is central to learning in schools, but that teachers often seem to get the lion's share of the turns at talk. In teacher-centered instruction, more assertive students volunteer to do lesson talk. Other students do get called on, but when most of the official, lesson-producing talk comes from the teacher, and only one person gets to talk at a time, many students simply don't get much experience with academic talk.

The Think Trix approach provides the conditions for students to talk smart by giving them both something cognitively demanding to talk about and the social structure where talking happens. Cooperative learning arrangements capitalize on a basic fact about social life: When someone says something to us, we are socially obligated to respond. In a large group, we can avoid talking, but we can't opt out of two-party talk without risking our social standing. (Here is a reason to emphasize pairs in cooperative learning, rather than larger groups in which reluctant students can get away with being silent.)

Register and Dialect

It's important to realize that talking smart—Simmons's informal term for academic talk—does not depend on using standard English. In Baltimore, many students speak a vernacular dialect. African American children in elementary schools who speak the vernacular dialect called African-American Vernacular English (AAVE) use that dialect most of the time in instructional interactions; European American children who speak a vernacular dialect do the same. People seem to believe that students who speak vernacular English

shift toward standard English when they address teachers; however, the research conducted as part of the project that produced this book found that such is not really the case. By hardly ever responding to students' contributions in ways that asked for rephrasing, most teachers demonstrated their expectations that students would use their home dialects in academic talk. The following short excerpt comes from a lesson in which a self-contained intermediate special education class was reviewing two fables in preparation for a comparison task:

Teacher: *Wait a minute. What was the problem in this story?*

Student: *That, that the grasshopper didn't have nothin' to eat.*

Teacher: *Okay, he did not prepare for the winter and he didn't have anything to eat.*

Notice that the teacher does not react to the student's use of the double negative "didn't have nothin'." She positively evaluates the student's response to her question about the story's problem ("Okay") and then goes on to rephrase it in standard English, the dialect that she normally uses in class. Nothing in what she says, including her tone of voice, suggests disapproval.

The point here is that academic talk does not have to be done in standard English; however, it can be. Research found that students did shift from AAVE toward standard English for certain kinds of classroom tasks, such as formal presentations to the group, writing, and dictation of sentences for the teacher to write (Adger, in press). The following excerpt from the same classroom, involving the same student, shows how this shifting works. This segment occurred later in the same lesson excerpted above. At this point the students are dictating sentences to the teacher, who writes them onto a large Venn diagram.

Student: *(dictating) The ants have something to talk about. The mice have nothing to talk about.*

Teacher: *What do you think the ants talk about?*

Student: *They were, they was talkin' . . .*

The interesting feature of this segment is the student's self-correction from the standard English subject-verb agreement (*They were*) to the vernacular English agreement (*They was*). This shift suggests that the two dialects of English, standard and vernacular, have different functions within the academic talk that makes up this lesson. Dictating sentences to be written requires standard forms, according to the unconscious norms for language use that operate in this classroom and the others studied; but responding to a teacher's request for information (as opposed to a request for dictation) calls for the vernacular.

Before leaving the topic of dialects, it is important to note that these excerpts come from elementary schools. The implicit sociolinguistic expectations about students' dialect and academic talk are different in other settings, such as in universities.

Reducing Teacher Talk

Giving students the chance to express themselves at length may mean reducing the proportion of teacher talk. That can be difficult. Teacher talk not only gives structure to lessons by controlling the flow of information but also helps to maintain social control. Neither of these functions can be jettisoned. If you are accustomed to running your classes by doing most of the talking, you will need to change gradually so that you can teach the students to take over some of the responsibility for lesson structure and getting information.

Other chapters have pointed out that cooperative learning activities, when they are carefully structured so that each group has one shared task, are a surefire method of shifting the burden of academic talk onto the students. Your talk, however, will always play an important role in cooperative learning, even as it decreases in quantity, because you will always be the one to present the learning tasks. Once you have made directions clear and students are working, though, you should resist the temptation to participate in their work. When teachers drop in on cooperative groups, they change the social structure, and this changes the discourse. Student responsibility for the group's work includes taking part in its talk. If you are there, the

talk patterns will change. Sit on the sidelines; make students come to you or call on you when they need you.

Teacher talk can be diminished in whole group instruction, too. The trick here is to avoid the lecture format (yes, it happens, even in elementary classes) and to create tasks that call for every student to respond in oral or written form. Think/Pair/Share is one such response structure; Quick Write is another. This strategy simply asks students to jot down their answers to some interesting question—such as what they think will happen next in a story you've read to them. Later, they can compare their predictions with the reality, working orally in pairs.

In small classes, students may have more chances to talk during traditional instruction, but it is important to make sure that this happens. Occasionally they can take turns responding aloud, as in the following example:

Santa's Little Helpers: Darlene

The hardest part for me in getting started with the Think Trix approach was in trying to stop myself from talking and let my students do the talking. Once I became aware of the need to let kids talk, I was appalled at how much time in each lesson I took up talking. No wonder the students were getting bored. It wasn't even so much the mental process of recognizing that I had to let my kids talk as it was the practical side of how to do it. Finally, I started to incorporate in my lesson planning some explicit attention to who would be talking.

Right before Christmas, we did holiday vocabulary in speech-language classes. I decided not to have the kids write letters to Santa as I had done in other years. Writing can be stressful for some of the kids, and others just write perfunctory lists of what they want Santa to bring them. Instead, I decided to let the kids ask questions of Santa, using the *wh-* words associated with Recall. The classroom teacher, Owen, agreed to be Santa for the lesson in his room. He really got into it, sprinkling his conversation with lots of "Ho, ho, ho" and giving creative answers that made the kids really want to ask him questions. They could ask Santa anything they wanted to know about him.

> I controlled the questions by writing the *wh*-question words on bits of paper and putting them into small jewelry boxes, the kind that snap shut. (This is an old trick for speech-language pathologists, one that younger children really love.) I handed out the jewelry boxes and then had the children make a question for Santa, using the word in their box. We had several rounds of this, and children didn't have any trouble thinking up new questions. I'm sure that the reason it worked so well is that Owen thought up interesting answers.

In this scenario, students' questions were interesting because of their power to get interesting responses from Owen, so students listened to each other and to him. Often, however, students don't listen to each other because what is being said is so highly predictable. This is the case when teacher Recall questions outnumber other kinds and when everyone knows the answer.

Reducing teacher talk requires deliberate effort. Making it a focus of your lesson planning can help a great deal in the beginning, as you break the teacher-as-talker mold. In planning lessons, plan for talk and writing. Figure out how to increase student participation. Use cooperative learning, of course, but also infuse extended student talk into direct instruction.

Increasing Student Talk

As important as talk is in classrooms, we often treat it as something negative: Such comments as "Stop the talking," "Who's talking?" and "I hear talking" suggest that student talk is out of place. Of course, it is sometimes, but as we work to engage students more fully in academic talk, we need to be clear with them about our goals. We need to make them aware of their academic talk, just as they are aware of their reading, and involve them in evaluating their own progress in this important domain. We need to make clear that there are times when they are supposed to talk, just as we make clear that there are times when they are not supposed to talk. When they are

expected to talk, such as during Think/Pair/Share, their talk is not optional; they *must* talk.

Sometimes students are afraid to express themselves for fear of being ridiculed. The social interaction instruction that you do when you teach cooperative learning to your students will emphasize the right of each student to participate and to make mistakes. Repairing mistakes, our own or someone else's, is a normal part of social interaction in any setting. Debriefing after cooperative learning activities can focus on the quality of the talk, including ways in which errors were corrected in such a way as to preserve good relationships, along with other concerns.

Think Trix and Questioning

The direct link between Think Trix and talking comes from the questions you and your students ask that index thinking types, either directly or indirectly. When you ask a question calling for higher order thinking, you want a linguistic response that reflects the student's cognitive response to the question. You may use the cue words listed earlier, but many questions from either you or your students will signal thinking in other ways. Being aware of the Think Trix symbols posted on the walls in your classroom can help you expand the kinds of thinking elicited by your questions and other prompts. One way to find out whether you need to get more variety into your questioning is to tape-record yourself and then analyze the prompts you give—the questions, the instructions. How frequently are you asking for higher order thinking beyond recall? Who is responding to your prompts? Are students staying engaged with the lesson because you are using Think/Pair/Share and other structures that require students to talk often?

Another way to use the response cues (the symbols) is to have students ask the questions of one another. You can adapt the Think Trix matrix presented in Chapter 8, making the focal points fit your lesson. Its graphic structure gives students a concrete tool to help

them ask interesting, cognitively demanding questions. As they ask questions, they can place markers on the cells in the matrix. A glance at the board will tell them which types of questions they still need to generate. Alternatively, students can ask questions of different types by referring to the symbols posted on the classroom walls. You will be able to think up ways to vary this kind of task. Sometimes the questions will be oral and sometimes written. Sometimes students will generate questions individually and sometimes in pairs. Pairs can exchange written questions with the other pair in their cooperative learning group. Sometimes questions will contribute to knowledge construction and sometimes to review.

When students do the asking, they are really controlling their own learning through academic talk and writing. The mechanics of Think Trix help to shape the questions they ask but do not automatically produce good questions; there is room for creativity. The responses to their questions are shaped by the questions, of course, but again individual creativity operates. The academic talk that students produce should convince them and you that oral language is an important part of their schooling.

Chapter Wrap-Up

Academic talk and writing are crucial to individual learning and to doing lessons. Talk needs to come from students as well as from teachers, and it needs to be planned for and evaluated. Cooperative learning activities provide the interactive environment for academic talk, but students need to learn to produce academic talk in cooperative learning work. Direct instruction can incorporate talk from every student, not just those who readily volunteer, and students can talk simultaneously in their groups. Careful planning for a variety of social structures during the school day, with attention to the talk that will be engendered, enables opportunities for teachers and students to share responsibilities for academic talk.

Discussion Questions

1. Analyze a tape recording of a lesson in your room. Look for the cognitive tasks your prompts call for. Are you providing enough opportunities for higher order thinking? Also look for opportunities to respond. Are your students opting out of lessons? What could you change so that everyone would have to be engaged academically? Set some specific goals for academic talk in your classroom; figure out how to address the goals; and check again after a couple of weeks.
2. Are all of your students able to produce academic talk? What could you do to aid the weakest talkers?

10

Feeling Good

Evaluating Professional Growth

The advice we've presented in the previous chapters and the stories from classroom experience in learning to use Think Trix have been intended to get you started with the Think Trix approach—to get your students thinking, talking, and cooperating. This chapter is about growth.

Weird and Wonderful

As special education teachers focused on students' educational difficulties, we found that the Think Trix approach really helped us see our students' strengths. "Every child can learn," they say. Well, yes, of course—we knew that. But when our students began to behave like students, rather than individuals with disabilities, we began to believe that in a new way.

Not Just Another Weird Fact: Zoey

Kevin was a good thinker, but he had trouble getting his ideas into sentences and he couldn't write things down. He

hardly ever participated in class either. Suddenly, when we started doing Think Trix, he got interested. It was a unit on social studies, and we were talking about things you would see in a jungle (Idea to Example). To make it fun for the kids, I brought in the Weird Facts books, and Nona and I started to discuss really weird things. Suddenly, Kevin stood up and said, "Ms. Napier." So I said, "Yes, go on." And he said, "Have you ever seen a white striped tiger before?" Ms. Kaltman and I looked at each other in surprise and said, "No." This is a kid who just sat there like a bump on a log, not talking at all. "It has black and white stripes. It's a Siberian tiger." He proceeded to tell us all about it. The next day, Kevin said, "I have something to share," and he showed us the model of a Siberian tiger he had brought in, plus he had books about it. This boy has taught me things I'd never known. It turned out that he'd been exposed to all this encyclopedic information at home.

As students in Kevin's class grew more skilled with Think Trix talk, they started to act more self-confident. Even a short Think/Pair/Share session invariably would have students, who had previously sat silently through class, raising their hands to share their pair's ideas. These changes in our students really galvanized us as teachers. Where we had all had days where "getting through" was about all we hoped for, we began to experience real excitement about our students' learning and interest in our classes, and that, of course, was just what we needed to keep us going.

Showing Off for the Gifted Class: Zoey

Once I got going with Think Trix, word got around my school. The GATE (Gifted and Talented Education) teacher was really interested. Imagine—a fourth- and fifth-grade GATE teacher interested in something going on in a primary special education class. But I was proud of my kids, and I invited her to stop by for a look. When she came by, with her class, I asked my students to help me explain Think Trix. (The visiting researcher turned on her tape recorder after we had already started.) Here's what my kids said:

Henry: *words to go with them, and, and when we hear a sentence, that we'll know that, that would help us.*

Researcher: *What are you talking about?*

Henry: *I mean they have words to go with the symbols.*

Researcher: *What symbols?*

Henry: *The, the like the Evaluation symbol and the Recall symbol.*

Researcher: *Okay, can you show me those?*

Henry: *These, this one.*

Researcher: *What is that?*

Henry: *Recall.*

Zoey: *What does Recall mean?*

Henry: *It means that you look back into the story to find the information. And this evaluate. It means to, judge something. To weigh it out, to see if (your) mind's, you know . . . em. You, um see the, judge the, make up your final decision.*

Zoey: *Anyone else? Those are the only two symbols you know about? Oh, come on! Give me another symbol, Walter!*

Walter: *Uh, they have, we have another symbol. Two. It looks like the same thing, but it's, but it's um.*

Zoey: *Go show them.*

Walter: *Both of them right there. They called Idea-to-Example, Example-to-Idea. . . . Both of them, one, both of them mean big ideas, and the little and the, and the small ideas.*

Zoey: *Anything else about them?*

Walter: *I don't know. [Students snicker.]*

Researcher: *Anyone else want to contribute to Example-to-Idea, Idea-to-Example?*

Zoey: *Anyone else? Come on, you know. [pause] Leslie, come on. Think of any other symbol. There's another symbol. Talk about main idea. Sh. Leslie?*

Leslie: *Huh?*

Zoey: *Can't do it? Too shy? Okay, Omar?*

Omar: *Compare and Contrast. One different and one same.*

Student: *Same.*

Researcher: *Which one is different?*

Omar: *Contrast.*

Zoey: *So, so how would you complete that um (box)? What would you do?*

Omar: *You fill it, you fill it, out, outside, outside.*

Zoey: *Uh huh, and what information do you put in it?*

Omar: *Outside the circle, you p—*

Zoey: *And what information do you put on the outside?*

Omar: *The different.*

Zoey: *Okay. And what would you do with the one that has—*

Omar: *Compare.*

Zoey: *the circles with the openings in the middle?*

Omar: *Put the s— you put the, the word that got, that has same, in the (middle).*

Zoey: *Yeah, all right, very good. Anyone else? Any more symbols? Is that all of them? Is that all of them? I think that's all.*

Student: *Huh uh . . . ain't all. Ooh.*

Researcher: *Oh. What is it?*

Zoey: *Oh, I'm sorry.*

Student: *Cause and Effect.*

Student: *Evaluation.*

Zoey's class demonstrated to the GATE class that they understood the point of Think Trix: As Henry said, "When we hear a sentence, that we'll know that, that [thinking type] would help us [think]." They also knew the mechanics of Think Trix: the thinking types, the symbols, and the cue words. Zoey was justifiably proud of her students' ability to describe the Think Trix typology. She did not fall into the trap of underestimating students' potential to learn and then watering down the content of lessons unnecessarily. Zoey had worked hard to teach her students about Think Trix so that they could use it instructionally.

Along with the excitement, we also felt more contented about what we saw going on.

Speaking Up and Taking Over: Darlene

Cooperative learning activities in speech-language class bring out some of the children who wouldn't perform otherwise. That makes them feel good because a lot of them come from classroom situations where they're getting lost in the shuffle and they don't get a lot of direct attention. They're used to being the lowest on the totem pole. But in a small group, they have the chance to be the leader sometimes and that gives them the self-confidence that they don't always have. It also gives those children who are stronger the responsibility to help someone else out. The oral language in small groups shows how much knowledge students really have.

As we varied our teaching by integrating Think Trix and cooperative learning, we actually had some time to watch our students from the sidelines. We really did do less moment-by-moment controlling of our classes and spent more time listening to our students.

That Was Then, This Is Now: Opal

I remember how difficult it was for me to use cooperative learning in my classroom at first. Having control over the classroom was important to me, so I was unwilling to give my students the freedom they needed to talk—which, I realize now, is necessary for successful cooperative learning. Once I was doing a science lesson where students had to work in groups using beakers of water and measuring cups. I was so tense about letting students talk that, when some of them spoke, I lost all patience and yelled at the whole class. I was so nervous that they would spill the water that I practically ended up taking over the task from them. Once everything was back under my control, I was fine. But the students weren't.

I've improved a lot since then. Now I love planning cooperative learning activities and build entire units around them.

> This month, students from one class where I provide speech-language services are writing up their favorite recipes into a cookbook which they will sell; the proceeds of the sale will pay for their meal at a fancy restaurant. Now I actually enjoy going around to the groups and listening to them talk. I am thrilled when a group is working smoothly.

A very dramatic example of the benefits of Think Trix to teachers was the way in which one of us, a very good veteran teacher on the verge of burnout, was revitalized. At the beginning of the project, she had been speculating that she might get out of teaching soon. By the end of the year in which she succeeded at introducing the new instructional approach in her class, she clearly enjoyed the children more and was enthusiastic and proud about what both she and they had accomplished.

Chapter Wrap-Up

Think Trix benefits students and teachers. Students get more experience with managing thought and turning it into academic language. They participate more in class as they work cooperatively with the fruits of thinking. As their metacognitive skills develop, so do their self-esteem and their engagement in lessons. The consequences for teachers can be a reinvigoration of professional commitment, a freshening of the interests and inclinations that brought us into teaching in the first place. We have learned to listen to our students more because what they say is more stimulating; we're more relaxed; and we're less focused on control. In short, we're closer to where we'd like to be professionally.

Discussion Questions

1. Think about the professional development experiences in which you have been engaged during your career. What experiences and relationships have been most valuable to you, and what is the nature of their value? How are you getting ongoing, quality professional development? If you feel stalled professionally, what could you do to get going again?
2. What role does evaluation play in your professional development? How do you evaluate your own teaching? Do you ever ask students to evaluate a lesson or an activity? Do supervisors' evaluations help you? If you want to increase the benefits of evaluation, what changes would you make and who would be involved?

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RESOURCE A

Activities

LINE UP

PURPOSE

Team building; practice sequencing

THINKING TYPE

Recall

GRAPHIC ORGANIZER

Parallel lines

SOURCE

Teresa Bridger, Prince George's County Public Schools

DESCRIPTION

1. Create two parallel lines on the floor, about 10 inches apart. Use tape or chalk.
2. Have students line up between the two lines.
3. Tell them that they are on a bridge over a pit of human-eating alligators and piranhas. If they fall off the bridge while completing the activity, they will become instant piranha food.

DISCUSSION

This activity has multiple uses.

1. Give each student a card with a number, letter of the alphabet, fraction, decimal, percentage, sentence from a story or line from a poem, or other information and have them get into sequential order.

2. To build teams, draw two bridges. Assign a sequencing task and award points for the team that finishes first without anyone falling off the bridge. Or tape the information onto the student's back so that he or she can't see it; someone else will need to read it. Or tell the students prior to doing the activity that they should give themselves one point for each person they pass as they form the correct sequence. After the activity is complete, see who had the most points and the least points. The winner is the person with the least points, because he or she was probably busy helping others, rather than getting points for himself or herself. Now have them do the activity again. Give the students the same directions, only tell them the team with the least number of points wins.

The activity can lead to other work. Students can be asked to:

a. Write items in sequence.
b. Write a paragraph about how they completed the task.

SINK OR FLOAT

PURPOSE

Teaching Compare (Similarity), Contrast (Difference), Example to Idea, Idea to Example, and Cause and Effect; teaching use of the Venn diagram; and teaching cooperative learning skills

THINKING TYPE

Compare, Contrast, Example to Idea, Idea to Example, Cause and Effect

GRAPHIC ORGANIZER

Venn diagram

SOURCE

Teresa Bridger, Prince George's County Public Schools

DESCRIPTION

1. Give each pair a Venn diagram, a container of water, and identical sets of small items that can sink, float, or do both.
2. Mark three sections on the Venn diagram. The outside, contrasting sections are "sink" and "float"; the inside, overlapping section is "do both."
3. Have students experiment with the items, placing each item where it belongs in the Venn.
4. With the whole group, discuss where each pair placed the items. Discuss different experiences.

DISCUSSION

Vary the task:

1. Have students guess where each item will fit on the Venn before they try it out in the water (Idea to Example).
2. Ask students to come up with other ways to group these items—by size, color, composition, and so on. Talk about Example to Idea.

Follow up with other activities:

1. Have students find and test other objects.

2. Have them tabulate their guesses and results on a table.
3. Have them discuss what they learned about what kinds of objects float and sink.

KISS ESTIMATION

PURPOSE

Teaching estimating

THINKING TYPE

Example to Idea, Idea to Example, Compare (Similarity), Contrast (Difference), Cause and Effect

GRAPHIC ORGANIZER

Chart

SOURCE

Teresa Bridger, Prince George's County Public Schools

DESCRIPTION

1. Give each group a ziplock bag with about half a bag of Hershey's Kisses or cereal in it. Without touching the bag, each person in the team guesses privately how many items are in the bag.
2. Have each team agree on a guess, again without touching the bag.
3. Record the team guesses on a chart on the board. Have students pick out the highest and lowest group guess—the range.
4. Have teams spread the bag flat and revise their guess if they want to. Record in the next column as an educated guess and discuss. Why did guesses go up or down or stay the same? Is the range narrowing? If so, discuss why this might be.
5. Have each team remove five items from its bag. Now have each team make a prediction as to how many candies were in the bag originally (counting the five they have removed). Record as a prediction and discuss. Have each group tell how it used the group of five to make its predictions. Look at the range and discuss.
6. If the range is still very large, repeat step 5, but have students use the group of five candies in a different way (one of the ways the other teams used it).
7. Have each team count its candies (younger students count by 1's; older students count by 2's or 5's). Record the actual numbers.
8. Finally, each team divides its candy evenly among the team members. If they have an odd number, they must figure out a way to

divide it evenly (they might cut it up, give it to another team, etc.). Then they may eat the candy.

DISCUSSION

Follow up with other activities:

1. Discuss the differences among guess, educated guess, prediction, and hypothesis.
2. Set up a "How many?" jar for a class contest.
3. Complete a math assignment on logical guesses or estimation.

AGREE/DISAGREE

PURPOSE

Teaching evaluation; team building

THINKING TYPE

Evaluation, Compare (Similarity), Contrast (Difference)

GRAPHIC ORGANIZER

Continuum

SOURCE

Adapted from Kagan (1993).

DESCRIPTION

1. Ask students a question that elicits judgments, for example: Should teachers give homework on weekends.
2. Have students stand in groups according to whether they agree or disagree. Or have students arrange themselves along a continuum from agree to disagree.
3. Have them give reasons for their choices.
4. Repeat the activity to determine whether judgments have changed with new information. Elicit explanations.

DISCUSSION

Use this activity before discussing issues on which students can be expected to have a variety of viewpoints, for example, whether everyone should be required to enter an essay contest; whether the main character of a story did the right thing; whether a Nobel Prize went to an appropriate recipient.

Activities for follow-up include:

1. Defending their position in a paragraph.
2. Writing persuasive paragraphs on both sides of an issue.
3. Getting additional information on the topic.

FORMING GROUPS

PURPOSE

Teaching Example to Idea and Idea to Example; team building; classifying

THINKING TYPE

Example to Idea, Idea to Example

GRAPHIC ORGANIZER

Circles

SOURCE

Adapted from Kagan (1993).

DESCRIPTION

1. Ask the class to form groups according to characteristics, for example: "Divide into three groups according to your ages"; "Get into groups according to whether you're wearing red today"; "Get into groups according to a singing group you like"; "Get into groups according to both gender and age." Don't tell them how to accomplish the task.
2. Have individuals explain how they grouped.

DISCUSSION

To use this strategy for instruction, you might give students information cards and then have them classify themselves into groups (e.g., Republican and Democrat presidents; fruits and vegetables; mammals and non-mammals). Or assign students to group one or two or three; name the groups (insects, reptiles, and birds); and have each student identify herself as an example of that group.

INTERVIEW GAME

PURPOSE

Question formation practice for language disordered students

THINKING TYPE

All

GRAPHIC ORGANIZER

Think Trix matrix

SOURCE

Carolyn Dinatale, Baltimore City Public Schools

DESCRIPTION

1. On slips of paper, write the names of fictional characters, such as Little Red Riding Hood, and/or real people, such as the school principal, with whom the students are familiar. Put the slips in a box or a drawstring bag and ask pairs of students to pull out one slip from it.
2. Working in pairs, students formulate questions to ask the person. Have them use the Think Trix matrix to ensure that the questions involve different thinking skills.
3. Working in their groups, a student plays the role of the character selected by the opposite pair while another group member asks the interview questions. The recorder writes down the interviewee's answers.
4. Pairs alternate in questioning.
5. Each pair reports briefly to the group.

DISCUSSION

For follow-up, students write up an interview with another character of their choice.

DIALECTS OF ENGLISH

PURPOSE

Enhance students' understanding of language variation

THINKING TYPE

Compare (Similarity); Contrast (Difference); Evaluation

GRAPHIC ORGANIZER

Venn diagram, chart

SOURCE

Adapted from Delpit (1990).

DESCRIPTION

Present the concept of language variation by drawing an explicit contrast between vernacular English and standard English. If some or all of the students use vernacular English, identify that as "home language." Call standard English "formal" English or whatever term the students use. Collect examples of each.

1. Students collect actual examples of contrasts between vernacular and standard English.
2. Post the contrasting lists on a chart.
3. Have students discuss the uses of the dialects, helping them to see that both are appropriate, but in different settings. Students also discuss how they feel about these dialects.

DISCUSSION

To follow up, stage events in which the students will use the appropriate forms of the language, for example, a formal dinner at the mayor's house and a family picnic.

Have the students create a bidialectal dictionary of vernacular language forms and contrasting standard English forms.

Create role-playing situations, puppet shows, and so on, where they must use appropriate forms of English.

DIALECTS IN THE MEDIA

PURPOSE

Enhance students' understanding of language variation

THINKING TYPE

Compare (Similarity); Contrast (Difference); Idea to Example

GRAPHIC ORGANIZER

Venn diagram

SOURCE

Adapted from Delpit (1990).

DESCRIPTION

The speech of various types of characters and members of different cultural, occupational, age, or gender groups is examined for differences and similarities.

1. In their groups, students select a TV show to watch at home, a taped story, or a radio show. Their choice is driven by what they have already noticed about language use in that show. Have them write down examples of language use that is tied to group membership. They decide whether they will look for pronunciation, vocabulary, or grammatical features.
2. Students bring their notes to class.
3. In their groups, students categorize and chart their data.
4. Students report their findings to the group.
5. Items are added to a class compendium of dialect items.

DISCUSSION

Locate stories written in different dialects for children to read aloud. Have them compare the different forms of language to their own.

Locate audiotaped stories narrated by individuals from different social groups and have students compare aspects of their dialects to the students' own dialects.

ROUNDTABLE

PURPOSE

Enhance total participation; activate background knowledge; review

THINKING TYPE

Recall, Evaluation

GRAPHIC ORGANIZER

List

SOURCE

Adapted from Kagan (1993).

DESCRIPTION

The teacher asks a question with many possible responses, for example: "Why is JFK so appealing?" Students list responses by writing them in turn on a single piece of paper that is passed around the group.

DISCUSSION

Follow up by introducing a lesson that relies on the background knowledge students have just called up.

This tactic can be used often.

NUMBERED HEADS TOGETHER

PURPOSE

Increase student participation; increase likelihood that all students know the information

THINKING TYPE

Recall

GRAPHIC ORGANIZER

None

SOURCE

Adapted from Kagan (1993).

DESCRIPTION

Group members decide together the correct response to a teacher question.

1. Assign numbers to members in each group—i.e., one through four. (Keep these number assignments; they are useful for many purposes.)
2. Ask a question to which there is one correct answer ("Define osmosis." "Who are our state senators?").
3. In each group, students whisper together or jot down answers to agree on the response. They determine that each member knows the answer.
4. Call out a number.
5. Students with that number raise their hands.
6. Call on one student for the response. Ask one or two others if they agree, or ask them to explain.

THREE-STEP INTERVIEW

PURPOSE

To activate background knowledge; to review information

THINKING TYPE

Recall, Evaluation

GRAPHIC ORGANIZER

List

SOURCE

Adapted from Kagan (1993).

DESCRIPTION

In their four-person groups, two students interview two others concerning a teacher prompt ("Do you think that every kid should be assigned to read *The Diary of Anne Frank*?").

1. Ask an evaluation question or another kind of question that calls for an extended response.
2. Everyone takes a minute to jot down ideas silently.
3. Assign students one and three to start off as the interviewer.
4. When the first interviewee is finished, interviewers and interviewees switch roles.
5. Students report in turn to their group what they learned from their discussion. Indicate which number should begin. Since the last speaker will probably have the least to say, make sure that you alternate numbers each time you do this activity.

DISCUSSION

Follow up by having students revise their lists, incorporating others' ideas. File the lists in students' folders for later use on tests, writing, or class presentation assignments.

Introduce a lesson that uses the interest and information that have been activated, or have students write a paragraph or complete a graphic organizer.

RESOURCE B

Symbols and Graphic Organizers

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Ex →

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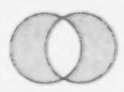
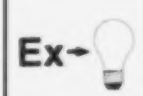
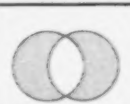
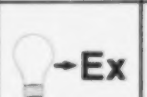
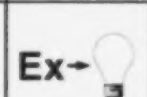
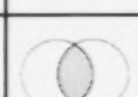
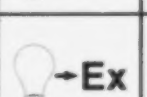
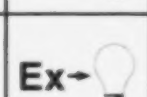
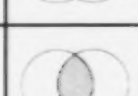
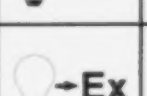
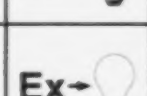
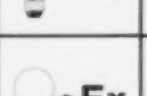
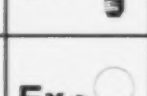
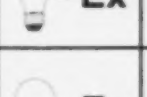
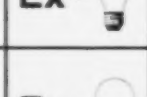
R						
R						
R						
R						
R						
R						

SEQUENCE CHAIN

PURPOSE

Review or plan sequencing

THINKING TYPE

Recall

SOURCE

McTighe (1992, Figure 12.2). Reprinted with permission of the Teachers College Press. Developed at the Maryland State Department of Education.

DISCUSSION

The sequence chain graphic organizer is useful for recalling the sequence of story events, numbers, letters, historical events, or steps for doing something. It is also good for planning. It can serve as a memory device for giving a report or studying for a test, and for reviewing.

Students may use this and the other organizers individually, as a pair task, or as a group task.

Words or pictures can be placed on the graphic organizer.

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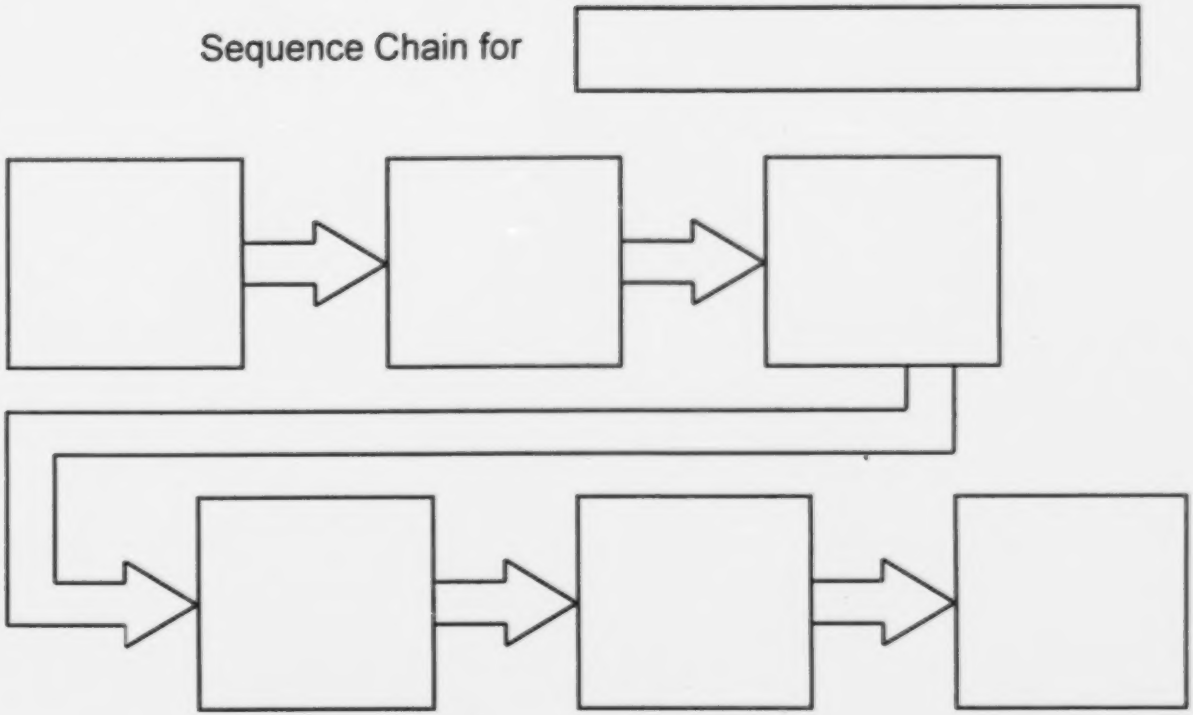
Sequence Chain for



CHARACTER TRAITS

PURPOSE

Aid in analyzing characters from fiction and nonfiction

THINKING TYPE

Example to Idea, Recall

SOURCE

McTighe (1992, Figure 12.5), reprinted with permission of the Teachers College Press, and McTighe and Lyman (1988, Figure 7), reprinted with permission of the Association for Supervision and Curriculum Development, copyright 1988 by ASCD, all rights reserved. Developed in Anne Arundel County Public Schools, MD.

DISCUSSION

Character analysis is a traditional part of literary criticism. This graphic organizer helps students see how events in a literary expose a character's essence.

Urge users to include personality and physical traits.

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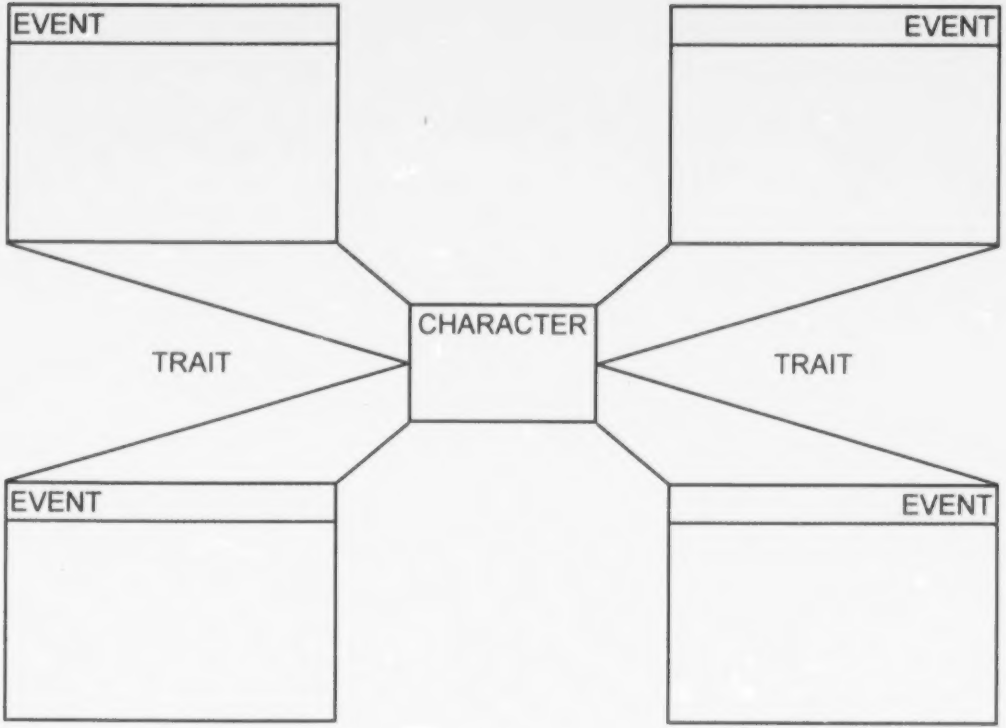

STORY MAP

PURPOSE

Aids in analyzing the setting, plot, and characters in a literary work and in planning a narrative

THINKING TYPE

Potentially all

SOURCE

McTighe (1992, Figure 12.3). Reprinted with permission of the Teachers College Press. Developed at the Maryland State Department of Education.

DISCUSSION

Filling in the graphic organizer leads students to identify the most important elements of the work. It reinforces the Western style of plot development.

STORY MAP

Title: _____

Setting: [ ]

Problem: [ ]

Event 1 _____

Event 2 _____

Event 3 _____

Event 4 _____

Event 5 _____

Solution: [ ]

Characters: _____ _____

_____ _____

_____ _____

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DECISION-MAKING MODEL

PURPOSE

To support the process of arriving at a data-based decision and to chart the history of a decision

THINKING TYPE

Compare (Similarity), Contrast (Difference), Evaluation, Cause and Effect

SOURCE

McTighe (1992, Figure 12.7), reprinted with permission of the Teachers College Press, and McTighe and Lyman (1988, Figure 8), reprinted with permission of the Association for Supervision and Curriculum Development, copyright 1988 by ASCD, all rights reserved. Developed at the Maryland State Department of Education.

DISCUSSION

Group decision-making is enhanced when all group members contribute to the process. The graphic organizer allows for each person's contributions to be entered.

This graphic organizer can also be used in analyzing a decision that has already been made, perhaps by a literary character or a historical or current leader.

Decision-Making Model

Problem	Goal(s)

Alternatives	Pros + & Cons -
	+
	-
	+
	-
	+
	-
	+
	-

Decision(s)	Reason(s)

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BUILD A STORY

PURPOSE

To aid in literary analysis and in planning a narrative

THINKING TYPE

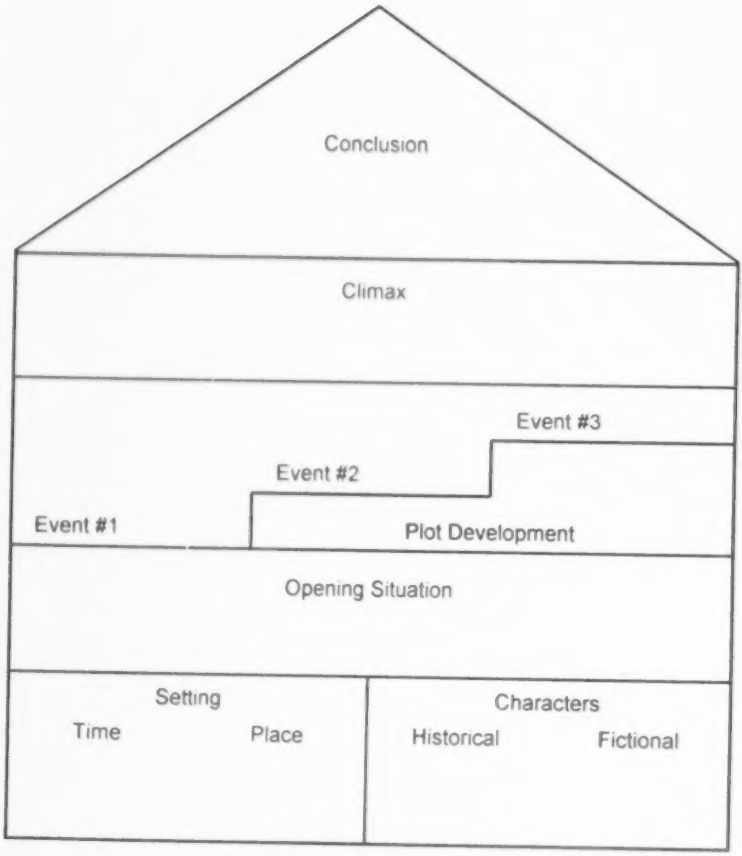
Potentially all

SOURCE

Developed in Prince George's County Public Schools, MD

DISCUSSION

The shape of the organizer suggests that a literary work is constructed of related aspects that all contribute to its structure.



BUILD A STORY

BUILDING A FAIRY TALE

PURPOSE

To aid in literary analysis and to help students plan their own fairy stories

THINKING TYPE

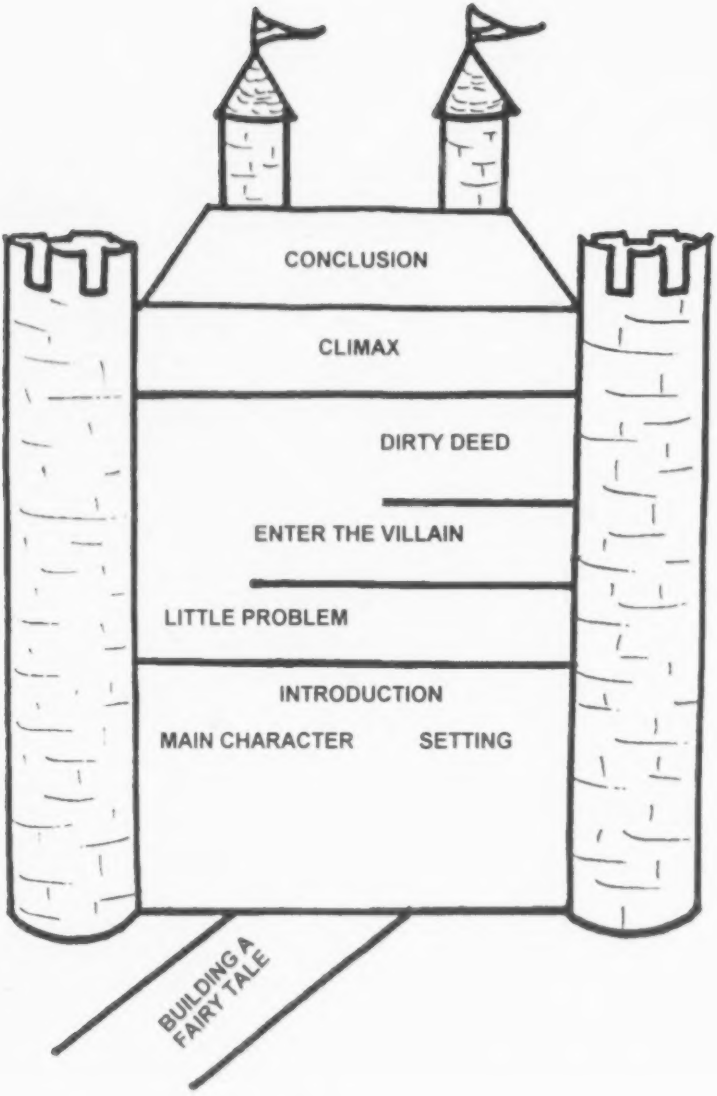
Potentially all

SOURCE

Developed in Prince George's County Public Schools, MD

DISCUSSION

For use in the early grades, this organizer shows students that fairy stories are likely to have "bad guys" whose behavior is crucial to the outcome of the story. It helps students see that although stories are very different from one another, they also share a framework.


CONCLUSION
CLIMAX
DIRTY DEED
ENTER THE VILLAIN
LITTLE PROBLEM
INTRODUCTION
MAIN CHARACTER
SETTING
BUILDING A FAIRY TALE

PLUSES AND MINUSES

PURPOSE

To elicit information relevant to making a judgment or to understanding a decision that has already been made

THINKING TYPE

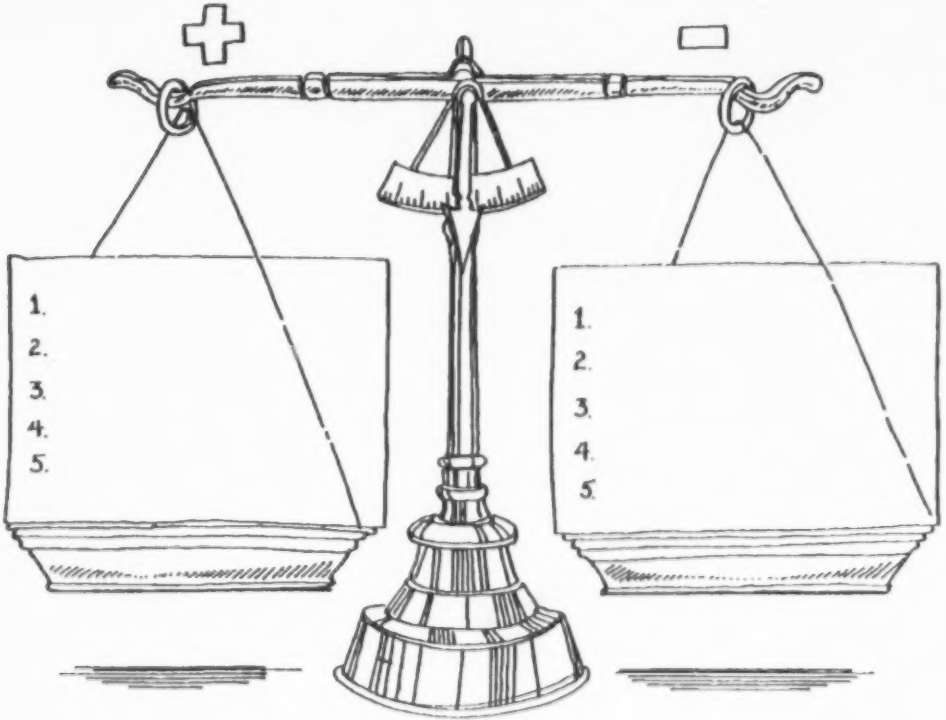
Evaluation, Compare (Similarity), Contrast (Difference)

SOURCE

Frank T. Lyman, Howard County Public Schools and University of Maryland

DISCUSSION

This organizer is especially useful in teaching Evaluation because it shows that various elements need to be considered.


1.
2.
3.
4.
5.
1.
2.
3.
4.
5.

VENN DIAGRAM

PURPOSE

To aid in determining similarities and differences between two items or sets of items

THINKING TYPE

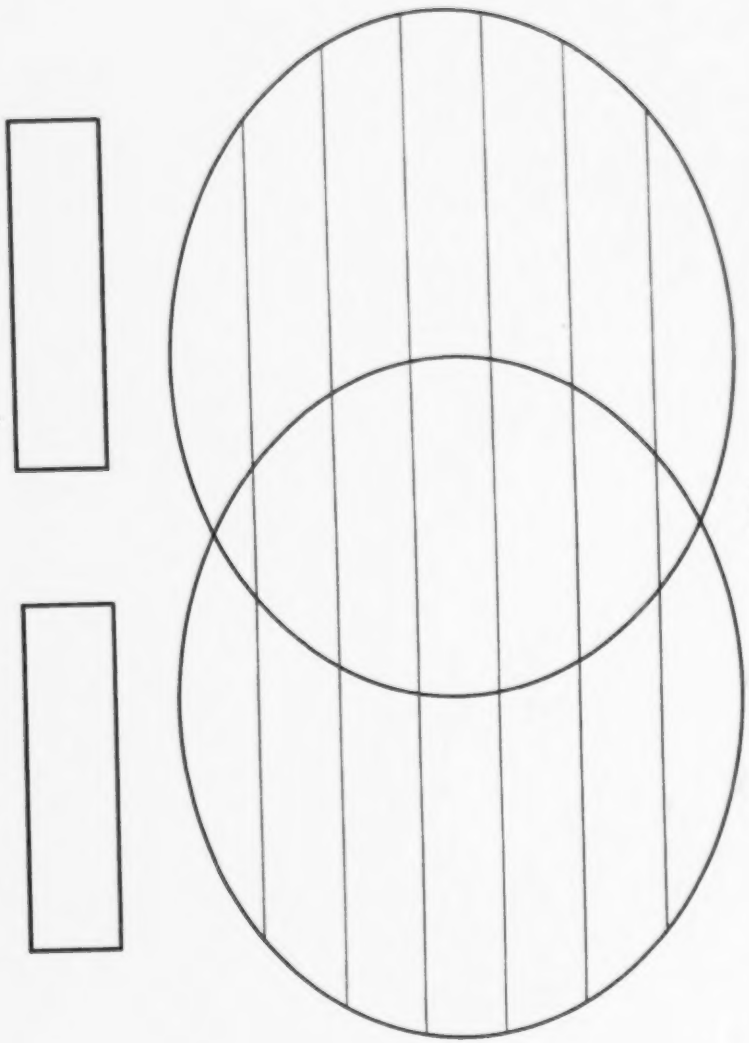
Similarity (Compare), Difference (Contrast), Idea to Example, and Example to Idea

SOURCE

McTighe (1992, Figure 12.8). Reprinted with permission of the Teachers College Press. Developed at the Maryland State Department of Education.

DISCUSSION

The open, unshaded Venn allows for students to record both similarities and differences. The title boxes list the general category for which the items written on the lines are specifics.



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RESOURCE C

Annotated Bibliography

Bellanca, J. (1990). *The cooperative think tank: Graphic organizers to teach thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing.

Bellanca, J. (1992). *The cooperative think tank II*. Palatine, IL: Skylight Publishing.

Intended for use across the grades, these collections present lessons that incorporate cooperative learning with graphic organizers. To order, call Skylight Publishing at (800) 348-4474.

Cohen, E. G. (1994). *Designing groupwork: Strategies for the heterogeneous classroom* (2nd ed.). New York: Teachers College Press.

Research-based discussion of how to provide for a variety of abilities, English proficiency, and social status makes this book relevant to today's classrooms. A separate videotape from the same publisher, *Status Treatments for the Classroom*, shows Cohen's strategies in use. Order from Teachers College Press, P.O. Box 20, Willeston, VT 05449-0020. Phone: (800) 575-6566.

Cooperative Learning: The Magazine for Cooperation in Education.

Cooperative Learning addresses such issues as using cooperative learning for teaching in various content areas, incorporating thinking skills instruction into cooperative learning, and adapting cooperative learning for special needs populations. It announces cooperative learning conferences around the country, including those held by local cooperative learning organizations.

To subscribe, write to International Association for the Study of Cooperation in Education, Box 1582, Santa Cruz, CA 95061-1582.

The 1993 Resource Guide, *Cooperative Learning: The Magazine for Cooperation in Education*, Vol. 12, No. 4, gives titles, authors, cost, publication information, and short descriptions of resources for teachers in the following areas:

- General introductions to cooperative learning
- Specific methods
- Strategies for specific groups
- Strategies for specific curriculum areas
- Model lesson plans
- Creating a cooperative learning community
- Cooperative sports and games
- Staff and organization development
- Theory and research
- Staff development videos

The resource guide can be ordered for $10 from the address listed above.

Costa, A. L. (Ed.). (1985). *Developing minds: Vol. I. A resource book for teaching thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.

Costa, A. L. (Ed.). (1992). *Developing minds: Vol. II. Programs for teaching thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.

Articles on teaching thinking and a checklist for teachers who are teaching thinking help the reader to develop a rich professional repertoire. Order from ASCD, 1250 North Pitt Street, Alexandria, VA 22314-1453.

Davidson, N., & Worsham, T. (Eds.). (1992). *Enhancing thinking through cooperative learning*. New York: Teachers College Press.

This volume includes 17 articles by teachers and researchers on cooperative learning, thinking skills instruction, and graphic organizers. In addition to chapters by Frank Lyman and Jay McTighe that are cited frequently in this book, there is one by David and Roger Johnson, whose work on cooperative is seminal to the field. Order from Teachers College Press, P.O. Box 20, Willeston, VT 05449-0020. Phone: (800) 575-6566.

Holt, D. (Ed.). (1993). *Cooperative learning: A response to linguistic and cultural diversity*. McHenry, IL: Delta Systems.

The authors addresses issues in including English language learners in cooperative groups. There is specific discussion of the language learning opportunities that cooperative learning provides. Order from Delta Systems Co., Inc., 1400 Miller Parkway, McHenry, IL 60050. Phone: (800) 323-8270.

Johnson, D. W., Johnson, R., Holubec, E. J., & Roy, P. (1994). *Circles of learning*. Alexandria, VA: Association for Supervision and Curriculum Development.

Written for educators rather than researchers, this book gives an overview of the rational for cooperative learning and how it can be used. Order from ASCD, 1250 North Pitt Street, Alexandria, VA 22314-1453.

Johnson, R., Johnson, D. W., & Holubec, E. J. (Eds.). (1987). *Structuring cooperative learning: Lesson plans for teachers*. Edina, MN: Interaction Books.

Lessons for pre-kindergarten through high school emphasize classroom process. They are easily adapted to various content areas.

Kagan, S. (1993). *Cooperative learning*. San Juan Capistrano, CA: Kagan Cooperative Learning. Phone: (800) 933-2667.

This book is one that every educator needs to buy and read from cover to cover. It presents all of the cooperative learning structures for which Spencer Kagan is known, describing each one

procedurally and functionally. Many are Kagan's own, and others come from other researchers and practitioners. The book summarizes the theoretical basis of cooperative learning, and it includes an annotated bibliography. Order it from Spencer Kagan, Ph.D., Resources for Teachers, 27134 Paseo Espana #202, San Juan Capistrano, CA 92675. The phone number is (714) 248-7757.

Marzano, R. J. (1992). *A different kind of classroom: Teaching with dimensions of learning*. Alexandria, VA: Association for Supervision and Curriculum Development.

Dimensions of learning is a broad, integrated approach to emphasizing thinking in the classroom. It distinguishes these dimensions:

1. Attitudes and perceptions
2. Acquiring and integrating knowledge
3. Extending and refining knowledge
4. Using knowledge meaningfully
5. Habits of mind

Think Trix fits well with dimensions 2 and 3. The book is very explicit and includes a section of graphic organizers. Order from ASCD, 1250 North Pitt Street, Alexandria, VA 22314-1453.

McTighe, J., & Lyman, F. (1988). Cueing thinking in the classroom: The promise of theory-embedded tools. *Educational Leadership*, 45(7), 22-24.

This article presents an overview of how Think Trix combines with graphic organizers and cooperative learning. Because many schools and school systems subscribe to this journal, this article is easy to locate. To subscribe, write to ASCD, 1250 North Pitt Street, Alexandria, VA 22314-1453.

National Center for Research on Cultural Diversity and Second Language Learning.

This consortium of universities and organizations publishes research and educational practice reports. The following concern instructional conversations—classroom discourse patterned on talk in situations of learning outside of school:

Echevarria J., & McDonough, R. (1993). *Instructional conversations in special education settings: Issues and accommodations.*

Goldenberg, C. (1991). *Instructional conversations and their classroom application.*

Rueda, R., Goldenberg, C., & Gallimore, R. (1992). *Rating instructional conversations: A Guide.*

Tharp, R. G., & Yamauchi, L. (1994). *Effective instructional conversation in Native American classrooms.*

Also of interest is a middle school American history unit for English language learners that emphasizes language, content, and thinking skills:

Short, D. (1994). *Protest and the American revolution.*

Order all of these publications from the National Center for Research on Cultural Diversity and Second Language Learning, Center for Applied Linguistics, 1118 22nd Street, N.W., Washington, DC 20037.

Schoenfield, M., & Rosenblatt, J. (1985). *Adventures with logic: Reproducible activities for grades 5-7.* Belmont, CA: David S. Lake.

Schoenfield, M., & Rosenblatt, J. (1985). *Playing with logic: Reproducible activities for grades 3-5.* Belmont, CA: David S. Lake.

Schoenfield, M., & Rosenblatt, J. (1985). *Discovering logic: Reproducible activities for grades 4-6.* Belmont, CA: David S. Lake.

Activities for teaching reasoning are valuable for introducing Think Trix and for using it in instruction. There are sections on

deduction, induction, sequencing, and other kinds of relationships. Problem solving is emphasized.

Shrestha, B. K. (1989). Understanding thinking skills. *OSSC Bulletin, 33*, 4. Oregon School Study Council.

This review of research on thinking and some programs on teaching thinking is intended for educators who want to put the insights from research to work. It is short and cogent. Order from 1787 Agate Street, University of Oregon, Eugene, OR 97403. Phone: (503) 686-5045. Fax: (503) 686-5890.

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Thinking, Talking, Cooperating

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